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THE JOURNAL OF ECONOMIC HISTORY

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*Intercompany Technical Standardization in the Early American Automobile Industry**

I

INDUSTRIAL historians have generally failed to note the importance of the technical standards that have been developed through intercompany agreements in the automobile industry. While they have studied the changing institutional character of American industry and have chronicled the mechanical developments of recent technology, they have undertaken but few explorations into the complex interrelationships between mechanical technology and business structure. In relating the growth of intercompany technical standards in the automobile industry up to about 1930, this study attempts to show the influence of changing business conditions on standardization and hence on the mechanical technology of the automobile.[1]

In the year 1910 engineers and industrialists in the young American automobile industry initiated an extensive program of intercompany technical standards. These standards dealt with dimensions of automobile parts and accessories, with specifications for purchasing of materials, and with such fundamental engineering practices as the design of screw threads. Members of a professional association, the Society of Automotive Engineers, organized the program and published and distributed the standards agreements among manufacturers throughout the industry. From the beginning, automobile manufacturers began following the standards, and within a few years they were widely accepted. By the 1920's most other branches of American industry had begun to recognize the importance of such intercompany standards. The work of the automobile engineers and other pioneers was emulated by dozens of new industrial standards organizations. The resulting high level of intercompany and interindustry technical co-ordina-

* The editors regret to report the death of George V. Thompson on July 26, 1953.

[1] This study does not consider the various commercial standards that trade associations have sponsored in the automobile industry.

tion has become one of the most significant characteristics of the modern industrial scene.

In a broad sense standards are simply agreements on common usage, and they have existed from the beginnings of organized society. Signs, language, weights, and common mediums of exchange are among the basic kinds of standards. They promote system and efficiency in social relationships. As a society advances industrially it begins to create other, more technical standards designed to make production more efficient and to facilitate use of the manufactured product.

The roots of modern technical standardization lie in developments of the nineteenth century. By the beginning of the century Eli Whitney was using standardized parts in the manufacture of muskets, thus becoming one of the earliest practitioners of modern production methods. Later in the century the railroad industry established standard coupling designs and a standard gauge. Through the Master Car Builders, an intercompany association, the industry also standardized designs and dimensions for many of the components of freight cars and other rolling stock. A few companies and professional engineering societies in the latter part of the century tried to establish intercompany standards for screw threads, pipe diameters, and the like, and by the 1890's the American Institute of Electrical Engineers was setting up standard ratings and standard practices for the manufacture and use of electrical equipment. Most of these and other early technical standards served two ends. They led to production economies, and they facilitated use of the industrial product. The more important of nineteenth-century standards were those which made parts interchangeable so that mass production was facilitated. These standards usually pertained only to single factories or companies. Those attempts to create common technical standards for an entire industry or for the nation met with only minor success before 1900.[2]

The factors that prevented intercompany technical standards from becoming extensive in nineteenth-century American industry are many and complex. Industrialization had proceeded historically from isolated factory units, and the forces of a capitalist economy strengthened the technological individuality and isolation of each company. Even when industrial combinations appeared toward the end of the century there was comparatively little technical standardization; the greater em-

[2] Brief accounts of early standardization efforts can be found in C. A. Adams, "Industrial Standardization," *Annals of the American Academy of Political and Social Science,* LXXXII (1919), 289–99, and in *Industrial Standardization* (New York: National Industrial Conference Board, 1929), pp. 1–15, 64–72.

phasis was on co-operation and agreement in the realm of marketing. Production technologies were still relatively simple and unsystematic. Mechanical designs were for the most part in those early stages of development that militated against standardization. Likewise, with markets expanding and business prosperous, there was little incentive to standardize in the interest of economy. The absence of intercompany standardization was the prevailing condition. Only with new motivations did standardization occur, as the experience of the automobile industry reveals.

II

Special characteristics of the young automobile industry helped to account for its pioneering role in developing intercompany standards. The growing dependence of manufacturers on each other for parts, materials, and services invited co-ordination. Nowhere was this dependence greater than in automobile manufacturing, with its requirements for rubber, steel, nonferrous metals, electrical apparatus, and machined products. At the same time, automobile operation invited the development of standard parts and accessory sizes to facilitate servicing and repair.

A rational need for intercompany standards did not automatically produce an effective program, however. Like most earlier efforts to establish intercompany standards, the first attempts in the automobile field had little success. By 1903 the first trade association in the industry was trying to establish standard wheel rims. But designs changed; few followed the standards; and the effort failed.[3] The next program of intercompany standards was sponsored by the Association of Licensed Automobile Manufacturers (A.L.A.M.), an organization formed in 1903 by licensees under the famous Selden automobile patent. The A.L.A.M.'s Mechanical Branch from 1905 to 1909 tried to establish standards for spark plugs, rims, and screw-thread dimensions, and for steel specifications—primarily for its member companies. The program had some success, but it collapsed in 1909 after the A.L.A.M. had registered a seemingly conclusive court victory over companies trying to manufacture automobiles without licensing under the Selden patent.[4] Participants in the activities of the Mechanical

[3] *Scientific American*, C (1909), 40–41; Lawrence H. Seltzer, *A Financial History of the American Automobile Industry* (New York: Houghton Mifflin Co., 1928), p. 42.

[4] Ralph C. Epstein, *The Automobile Industry; Its Economic and Commercial Development* (New York: A. W. Shaw Co., 1928), pp. 227–35.

Branch have given several reasons for its collapse. According to one, it was dropped because of legal reasons, but others believed that the standards program had been considered by most as a weapon in the struggle against unlicensed manufacturers and that when victory seemed assured the association dropped the standards work.[5] Whatever the reasons, in 1909 intercompany standardization activities in the industry came to a standstill.

In 1910 two new factors were instrumental in turning past standardization failures in the automobile industry into a successful, extensive program. First, a brief but sharp economic crisis gripped the new industry. Second, a body of professional automobile engineers, without trade association entanglements, stood ready to help create intercompany standards.

The economic crisis in automobiles grew out of conditions within the industry. During the late 1890's and early 1900's automobile designs were still experimental, public demand was unpredictable, and the feeling that the motor car was an expensive novelty with limited market potential was widespread. The industry attracted little investment capital; the number of companies multiplied, but most were very small. The few thousand automobiles produced during these early years came from the makeshift factories of scores of competitive companies with meager resources. Unable to finance adequate plant facilities of their own, these early automobile builders purchased their parts from outsiders instead of manufacturing them. They were primarily assemblers. In this fashion the early companies partially solved their financial problem, but the solution was vulnerable. The arrangement depended on the stability and economic health of supplier companies.[6]

Stability, of course, was not to be expected in the infant automobile industry. Business conditions in general were depressed in 1907 and 1908, and the first merger in the industry, the formation of the General Motors Company in 1908, added to the uncertainty. By 1910 the new combine had gathered in some twenty smaller companies, with a total of 21 per cent of the nation's motor vehicle production. Rumors of other mergers were rampant, and the small independents found it more difficult than ever to obtain credit and capital. Most disturbing of all was the success of the Ford Motor Company. Ford emphasized low-priced, mass-produced automobiles rather than expensive designs.

[5] President Howard E. Coffin, "S.A.E. Succeeds Mechanical Branch of A.L.A.M.," *Automobile*, XXII (1910), 979; P. M. Heldt, "The S.A.E. at Twenty-Five," *Automobile Industries*, LXII (1930), 790–91.

[6] Seltzer, *Financial History of Automobile Industry*, pp. 19–20.

By 1908 his famous Model T was in production, and within two years he was producing 10 per cent of the total national output.[7] Meanwhile, members of the A.L.A.M., almost 90 per cent of the industry by 1910, were losing the market for their higher priced products and were talking about the problem of overproduction in the industry.[8] At the same time, since Ford refused to pay royalties on the Selden patent, the A.L.A.M. tried to ruin him by legal action and advertising attacks. The fight against Ford failed, however; the A.L.A.M. collapsed within a year; and the small independents in the industry were less secure than ever.[9]

The crisis of 1910 climaxed the unstable conditions of the automobile industry. In all, eighteen automobile manufacturers failed in the year, a sharp rise from the average of one a year during the seven preceding years. Numerous suppliers of parts shared their fate. Many of the forty or more remaining small producers faced similar ruin, partly because of their dependence on supplier companies for parts. Each automobile builder, with his unique parts designs, found it almost impossible to obtain parts elsewhere, if his regular parts supplier failed. The smallest companies were hurt most, since it had not been easy for them to distribute parts orders among several suppliers. With parts unobtainable, production came to a standstill in many plants.[10]

III

It was in this time of crisis that the members of the Society of Automotive Engineers, the majority of them employees of the companies most in distress, set up their standards program.[11] Most credit for inaugurating the program should go to Howard E. Coffin, elected president of the society in 1910. As an engineer Coffin appreciated the general value of standards; as a vice president of the Hudson Motor Car Company he knew from firsthand experience the seriousness of the parts and materials crisis, especially for small manufacturers. He also

[7] The Studebaker-E.M.F., comprising 8 per cent of national output of 187,000 vehicles in 1910, was another threat to smaller producers.—Albert Russel Erskine, *History of the Studebaker Corporation* (Chicago: The Studebaker Corporation, 1924), p. 33; Seltzer, *Financial History of Automobile Industry*, pp. 36, 65–66, 169.

[8] "A.L.A.M. Tenth National Show; January 8 to 15, 1910," *Automobile*, XXII (1910), 1 ff.

[9] Seltzer, *Financial History of Automobile Industry*, pp. 39–41.

[10] *Ibid.*, pp. 31–32, 65–66; John K. Barnes, "The Men Who 'Standardized' Automobile Parts," *World's Work*, XLII (1921), 206.

[11] Prior to 1917 the society was known as the Society of Automobile Engineers.

knew that amelioration was possible through intercompany standards for purchased parts and materials. If parts producers could make a few standard sizes or designs of a part or material instead of different ones for each of their purchasers, the benefits would be great. With many sources of supply, the automobile manufacturer would be less vulnerable should some supplier companies fail. There would likewise be mass-production economies, even though individual orders remained small. Coffin bluntly told the society's members that, by not having organized intercompany standards before, the industry's engineers were "responsible for nine-tenths of the production troubles and most of the needless expense entailed in the manufacture of motor cars." [12]

A parts supplier, discussing intercompany standards at a later society meeting, emphasized their value to automobile concerns. Standards would result in "better deliveries, higher quality; ability to buy out of stock for rush orders; less danger of accumulating year by year dead stock due to . . . ordering special sizes and making changes; . . . possibly better prices." [13]

Standards would also, of course, aid the parts and accessories manufacturers. Reduction in varieties of a part would reduce tooling and set-up expenses, make possible long production runs, and provide the general economies of high output. They would also mean a broader potential market for suppliers, with less dependence on the prosperity of specific buyers.[14] In short, Coffin and others thought that intercompany standards might prevent disaster for many automobile companies and parts suppliers.[15] "No other organization," Coffin told members of the Society of Automotive Engineers, "has ever had such an opportunity . . . to wield its influence for the direct and immediate good of that business which has called it into being." [16]

The organization that responded to Coffin's proposal had received

[12] *The Society of Automobile Engineers; 1910 Transactions* (hereafter cited as *S.A.E. Transactions*), V (1910), 125–26; also, *S.A.E. Transactions,* VI (1911), 339; Barnes, "The Men Who 'Standardized' Automobile Parts," *World's Work,* XLII (1921), 206.

[13] H. S. White, "Seamless Steel Tubes—Standard Sizes and Gauges," *S.A.E. Transactions,* V (1910), 249.

[14] K. W. Zimmerschied, "The Value of Standards in the Manufacture of Automobiles," *S.A.E. Transactions,* X (1915), Pt. II, 464–67.

[15] Coffin cited additional reasons for standardization, but he suggested that because of the financial crisis first attention be given those standards which would alleviate the purchased-parts problem.—*S.A.E. Transactions,* VI (1911), 339. A 1910 trade journal article charged that past prosperity had hampered standardization, but that in the prevailing financial crisis the need for standardization was paramount.—*Automobile,* XXII (1910), 588–89.

[16] *S.A.E. Transactions,* V (1910), 125.

little attention before 1910. Launched five years earlier by a small group of automobile engineers and trade journalists, the purpose of the S.A.E., as the society came to be known, had been "to promote the Arts and Sciences connected with Engineering and Mechanical Construction of Automobile Vehicles"—primarily through the reading and publication of technical papers.[17] The Mechanical Branch of the A.L.A.M. seemed more important to most engineers, however, and many could see no need for a professional organization of automobile engineers. In its first five years the society attracted fewer than three hundred members.[18]

Perhaps the society's slow acceptance accounted for its flexibility in organizing the standards program. More to the point, the society's members, most of them employed by automobile concerns, were personally threatened by the crisis in the automobile industry. As President Coffin said, "There is no use dodging the issue that our personal interests, Society interests, and the interests of every member in the various allied industries are bound up in getting the automobile industry upon a stable basis."[19]

The new activity invigorated the S.A.E. It took over the old standards records of the A.L.A.M.'s defunct Mechanical Branch.[20] It also started a drive for new members. Coffin knew that only broad support could make intercompany standards effective; at his suggestion draftsmen and engineers from allied industries were encouraged to join the society.[21] The society hired Coker F. Clarkson, formerly manager of the Mechanical Branch, even though sufficient funds did not exist.[22] Within a year, however, Clarkson's salary as S.A.E. manager had been subscribed, membership had tripled to nine hundred, and members of the society's Standards Committee were eagerly at work.[23]

Fortunately, the first chairman of the Standards Committee had an advantageous perspective and practical outlook. Having been a consulting engineer for the A.L.A.M., Henry Souther, like Coker Clarkson, saw the industry from a collective rather than a company viewpoint.

[17] From the S.A.E. Constitution, *S.A.E. Transactions,* IV (1909), 1; also, Herbert Chase, "S.A.E. Celebrates Its Silver Anniversary," *American Machinist,* LXXII (1930), 861–62.

[18] Chase, "S.A.E. Celebrates," *American Machinist,* LXXII (1930), 861–62; *S.A.E. Transactions,* V (1910), 143.

[19] *S.A.E. Transactions,* V (1910), 136.

[20] Heldt, "The S.A.E. at Twenty-Five," *Automotive Industries,* LXII (1930), 791; *S.A.E. Transactions,* V (1910), 135, 137.

[21] *S.A.E. Transactions,* V (1910), 132.

[22] Barnes, "The Men Who 'Standardized' Automobile Parts," *World's Work,* XLII (1921), 204; *S.A.E. Transactions,* VI (1911), 21.

[23] *S.A.E. Transactions,* VI (1911), 467.

He perceived the value of intercompany technical co-ordination, especially if it were voluntary instead of coercive. Though an intercompany standard asked conformity from a manufacturer, if properly created it should be helpful rather than harmful. Many issues were involved. Some items should be standardized; some should not. Some should be standardized early, and some later, after designs had matured. Every engineer and every company had an opinion, and everyone would be affected. Therefore, in establishing a standard, as many viewpoints as possible should contribute to the final decision. Then it would represent the most practical approach possible.[24]

The S.A.E. set up its standardization procedure in line with Souther's ideas. The Standards Committee was split into divisions, each to develop standards on some specific group of parts or materials. In each division were engineers representing both suppliers and purchasers. The divisions held conferences, often in conjunction with manufacturers, and they made surveys of prevailing practices. Usually members of the divisions themselves developed the recommended standards on the basis of collected information, though some groups of accessories manufacturers had already done previous work, which was usually corroborated and extended. The division's recommendations went first to the Standards Committee assembled, then to the membership for approval.[25] After approval, the recommendations were published in "Standards Sheets" and in the *S.A.E. Handbook,* either as S.A.E. Standards or as Recommended Practices.

In this manner, S.A.E. members had, by 1921, created and published 224 different sets of standards and recommended practices.[26]

Most of them dealt with parts and accessories dimensions, and they usually involved a reduction of varieties. For instance, thirty-five standard lock washers were selected out of more than three hundred designs previously used by the industry.[27] Standards on steel tubing reduced varieties from 1,100 to 150.[28] Dimensional standards for tires,

[24] Henry Souther, "The Standardization Work of the S.A.E.," *S.A.E. Transactions,* VII (1912), Pt. II, 28–47; also, "President's Address," *S.A.E. Transactions,* VI (1911), 62–63, 460–69.

[25] Approval by the entire membership was dropped in the early 1920's.

[26] *S.A.E. Transactions,* VII (1912), Pt. II, 31–32; "Extent and Effect of S.A.E. Standards," *Journal of the Society of Automotive Engineers* (hereafter cited as *S.A.E. Journal*), IX (1921), 4; "History of Automotive Standardization," *S.A.E. Journal,* XXVI (1930), 700 f.

[27] Coker F. Clarkson, "Government Transportation Plans: Great Work of the Society of Automobile Engineers in Standardizing Parts," *Scientific American,* CXIV (1916), 582.

[28] "Second Report of Seamless Steel Tubes Division," *S.A.E. Transactions,* VI (1911), 522–24.

rims, spark plugs, wheels, and lighting equipment also aimed at a reasonable minimum of different sizes. Generator mountings and carburetor flanges were standardized, making the interchange of different makes possible.[29] Other standards covered dimensions for poppet valves, rod and yoke ends, steering-wheel hubs, throttle ball joints, body frames, and generator brushes. Among the most important of the dimensional standards were those on screw threads, nut and bolt measurements, and broach and spline designs.

Other standards pertained to materials specifications, the most important being for iron and steel alloys. Previously, steels had been sold by brand name or by each manufacturer's own specifications. The S.A.E. standards could be used by all purchasers and suppliers.[30]

IV

The ultimate test of standards, of course, was not simply publication, but use. Wishing to avoid coercive measures, the S.A.E. made few official attempts to measure the use of its standards. A variety of clues, however, will reveal their acceptance and importance.

From the beginning, the standards were in demand, both by suppliers and vehicle manufacturers. Shortly after the work started, J. M. Mack, of Mack Brothers Motor Company, implored the Standards Committee to hasten the completion of wheel standards. "The adoption of the standards is absolutely imperative at this time, as truck manufacturers are now placing orders for wheels," he wrote.[31] Within two years the chairman of the Wheel Dimensions Division reported "very conclusive proof that the standards [were] in effect, very practicable and very much welcomed in the industry."[32]

In 1915 the S.A.E. opened a Detroit office, which hastened acceptance of the standards. The following year a society questionnaire revealed that, of the companies answering, 94 per cent were using S.A.E. screw and bolt standards,[33] 90 per cent the lock washer and wheel and rim standards, and 93 per cent the spark plug standards.[34]

[29] Souther, "The Standardization Work of the S.A.E.," *S.A.E. Transactions*, VII (1912), Pt. II, 28–47.

[30] This survey of S.A.E. standards has been derived from an examination of the Standards Committee reports and standards discussions in the *S.A.E. Transactions* (1911–20).

[31] Letter from Mack in *S.A.E. Transactions*, VI (1911), 538.

[32] *S.A.E. Transactions*, VII (1912), Pt. II, 70.

[33] Clarkson, "Government Transportation Plans," *Scientific American*, CXIV (1916), 582.

[34] Russell Huff, "Industry's Debt to the S.A.E.," *Automobile*, XXXIV (1916), 1019; *S.A.E. Transactions*, VII (1912), Pt. II, 70.

As S.A.E. engineers had anticipated, the standards were responsible for considerable savings. In 1916 Colonel Charles Clifton, president of the National Automobile Chamber of Commerce, the trade association built on the ruins of the old A.L.A.M., stated that the S.A.E. standards program had been "one of the greatest factors in the upbuilding of the industry as it is today."[35] His organization and the parts and accessories manufacturers' trade association soon began making financial contributions to support the work.[36] The National Automobile Chamber of Commerce later estimated that S.A.E. standards led to a 30 per cent cost reduction in the manufacture of ball bearings and electrical equipment and a 20 per cent reduction in steel costs.[37] A rubber manufacturer claimed that standards on tire dimensions enabled him to triple production with his present equipment. In 1921 a writer in the trade journal, *Automotive Industries,* which had promoted S.A.E. standards from the start, generously estimated, on the basis of a survey of 150 engineers and executives, that the standards accounted for an annual savings of $750 million, or 15 per cent of the retail value of automobiles.[38]

Apparently S.A.E. standards in their first ten years had proved outstandingly successful and valuable to the entire industry. Yet, even though participation in the program was open to engineers from all concerns in the industry, a close examination shows that in these early years it was primarily the smaller companies of the industry that created, followed, and admitted the value of the standards.

The early Standards Committee was dominated by engineers from small companies. Among the nineteen chairmen of the committee's divisions in 1912, the largest manufacturer represented was the Hudson Motor Car Company, which that year produced only 5,000 vehicles, compared to Ford's 78,000, General Motors' 49,000, and Studebaker's 28,000. Typical chairmen and division members were from parts companies or such small automobile concerns as the Locomobile Company, Pope Manufacturing Company, Pierce-Arrow Motor Car Company, and the Lozier Motor Company. Of the 109 members on the Standards Committee, only three were from General Motors, none from Ford, Studebaker, Willys-Overland, or Reo.[39] Yet these last five companies

[35] *S.A.E. Transactions,* XI (1916), Pt. I, 376.
[36] George W. Dunham, "Address of President," *S.A.E. Transactions,* XIII (1918), Pt. I, 81.
[37] Editorial, "Using Standards," *Automotive Industries,* XLVI (1922), 142.
[38] Herbert Chase, "Executives Should Foster Use of Standards," *Automotive Industries,* XLV (1921), 1101 f.
[39] *S.A.E. Transactions,* VII (1912), Pt. II, 318–20.

alone produced more than 49 per cent of the nation's vehicles in 1912.[40]

That the standards were most valuable and most used by small companies is confirmed by two surveys made to assess the worth of the S.A.E. program. In 1914 the trade journal *Automobile* solicited the opinion of engineers in the industry, and in 1921 the society asked for comments from automobile executives. Favorable responses were published following both surveys. Presumably the most influential statements would have been printed. Yet the largest automobile manufacturer represented among the endorsements was the Packard Motor Car Company, which in 1917 built only 1 per cent of the nation's vehicles. Other statements were from smaller producers such as the Woods Motor Vehicle Company, Cadillac Motor Car Company, and Peerless Motor Car Company and from parts suppliers such as the Timken-Detroit Axle Company and the Standard Steel Spring Company.[41] There were no endorsements from such leading automobile producers as Ford, Studebaker, Willys-Overland, Reo, Dodge, Nash, Maxwell, or General Motors (except for Cadillac). Yet in 1917 these eight companies alone accounted for 73 per cent of total production.[42]

While small companies were acknowledging the worth of the early S.A.E. standards, most of the large corporations in the industry displayed little interest. Among the leading producers only General Motors took an interest, and it was concerned primarily with steel specifications rather than with detailed parts standards.[43] A vice president of the Nordyke-Marmon Company, one of the smaller concerns, complained of the "lethargy and the lack of support that these [S.A.E.] standards have met from the great executives of the industry."[44] In 1921 a trade journalist, writing about the S.A.E. standards program, observed that "on the whole there appears to be but slight appreciation of its great value."[45] One engineer at an S.A.E. meeting in 1922 commented that it seemed as if the most successful concerns in the passenger car industry had paid the least attention to the standards.[46]

40 Seltzer, *Financial History of Automobile Industry*, p. 57.

41 "Makers Save by Using S.A.E. Standards," *Automobile*, XXXI (1914), 74–75; George W. Dunham, "S.A.E. Standardization," *S.A.E. Journal*, IX (1921), 373–74.

42 Seltzer, *Financial History of Automobile Industry*, p. 57.

43 A General Motors metallurgist, K. W. Zimmerschied, became chairman of the Standards Committee in 1915.

44 F. E. Moskovics, "Increased Use of Standards Essential to Future Automotive Prosperity," *Automotive Industries*, XLVII (1922), 671.

45 Chase, "Executives Should Foster Use of Standards," *Automotive Industries*, XLV (1921), 1102.

46 A. F. Masury, chief engineer of Mack Trucks, Inc., cited in "Myers Suggests Axle Standardization," *Automotive Industries*, XLVI (1922), 713.

Although the large producers had paid the least attention to early S.A.E. standards, they had not ignored standardization. Instead, while small firms were getting most of the benefits of intercompany standards, the large corporations were standardizing internally. Ford had led the way, even before 1910, and just one year after the S.A.E. program began, General Motors undertook an intensive standardization program of its own.[47] Internal standardization gave the large manufacturers production economies that the small companies gained through intercompany standards. As to purchased parts, the big producers, with their large orders, got economical prices regardless of standardization with other purchasers. Further, the large companies began manufacturing their own parts. Ford adopted the slogan, "From Mine to Finished Car; One Organization," and General Motors bought out many parts manufacturers, especially after the First World War. The dollar ratio of purchased parts to wholesale automobiles for the industry dropped from 55 to 26 per cent from 1922 to 1926.[48] With internal standardization, high production, and the trend toward manufacture of parts, the big companies were understandably less concerned with S.A.E. standards.

V

Despite the economic assistance S.A.E. standards rendered to small automobile producers, many small companies soon went to the wall. Although in 1921 there were eighty-eight active producers of automobiles, five years later there were only forty-four. At that time Ford and General Motors together made 60 per cent of the total annual output of vehicles; with eight other leaders the figure stood at 89 per cent.[49]

As the small companies declined and disappeared, however, the S.A.E. standards program did not collapse. Though the program initiated by the early S.A.E. engineers had been of chief value to small producers, industry-wide standards could be advantageous for large corporations as well. Large automobile manufacturers did not purchase so many small parts, but they still depended on materials and equipment from other industries. Here standard specifications con-

[47] L. A. Danse, "Standards Activities in General Motors Corporation" (Address before Graduate School, National Bureau of Standards, March 24, 1950); also, Seltzer, *Financial History of Automobile Industry*, p. 100.

[48] Seltzer, *Financial History of Automobile Industry*, pp. 57–59.

[49] *Ibid.*, p. 57.

tinued to be immensely valuable. Standards that made the operation and servicing of vehicles more efficient were especially important to the large corporations, which needed large and expanding markets for their prosperity.[50] The industry, whatever its corporate structure, would also continue to benefit from common agreement on screw threads, nuts and bolts, and the like. So the S.AE.. program continued, but it changed in character and emphasis to meet new needs.[51]

The transition in the S.A.E. program in the 1920's is clear from an analysis of the personnel participating and from a study of the standards themselves. General Motors engineers by 1925 had become the most prominent participants. Five of the Standards Committee's division chairmen or vice chairmen were from General Motors, and General Motors representatives were on sixteen of the twenty-one divisions dealing with motor vehicles. Engineers from most other large automotive corporations also occupied prominent positions on the committee.[52] Only the Ford Motor Company, reflecting the extreme individualism of its founder, was conspicuous by the absence of its engineers from the committee's roster.[53]

The changed character of S.A.E. standards for the industry is shown in an *S.A.E. Handbook* of the early 1930's. Now the standards that received the most attention were those which systematized interindustry purchasing, promoted efficiency of automobile operation, and established basic engineering practices. Standard steel specifications, standard screw-thread and nut and bolt designs, electrical apparatus standards, and tire, rim, and spark plug standards were among the most important. There were also new standards on crankcase oils, production tools, and on commercial vehicle operation.

On the other hand, most of the detailed standards for automobile parts so important to the parts-purchasing automobile builders of earlier years had disappeared. Such standards as those on carburetor lever arms, differentials, door hinges, steering-wheel hubs, generator brushes,

[50] It should be noted, however, that, as markets expanded, standards for accessories were less necessary, since each service station or repair center could afford to stock more varieties.

[51] Many of these reasons for standardization were realized in some measure at the beginning of the S.A.E. program, though at the start standardization to relieve the parts and materials purchasing problem was the overriding consideration.

[52] "Personnel in 1925 Technical Committees," *S.A.E. Journal,* XVI (1925), 151–54.

[53] The Henry Ford Archives contain only one substantial piece of correspondence between Ford and S.A.E.—a letter in 1908 from Ford's office to the secretary of S.A.E. refusing a request to deliver a paper on "Simplicity of Automobile Design" before an S.A.E. meeting (Henry Edmunds, Ford archivist, to author, October 22, 1952); also, interview with Don Blanshard, Manager of Technical Committees Division, S.A.E., November 14, 1952, Madison, Wis.

and body frames had gone. Some detailed parts standards remained, such as those on rod and yoke ends, poppet valves, and clutch and flywheel housings, but they pertained primarily to trucks, where small companies and low production still prevailed in the 1920's.[54]

The transition in the character of automotive standards was epitomized by S.A.E.'s general manager in 1934, when he wrote, "New conditions . . . lessened the need for new detailed standards for the interchangeability of parts and emphasized as the standards of greatest value those of a more fundamental character which apply commonly to all industries rather than to one specialized industry." [55]

Most automobile corporations used S.A.E. standards in the 1920's, especially those on purchase specifications, but there was never blanket acceptance.[56] For instance, despite the importance of standard tire sizes to the consumer, as late as 1928 only forty-four of the ninety autombile models in production were equipped with such sizes.[57] In 1930 the director of General Motors' own standards program implored individual manufacturers in the industry to follow the S.A.E. standards, even though they might not furnish immediate savings.[58] Despite such pleas, S.A.E. standards were usually followed only when an economic advantage resulted. The small companies had followed the old detailed parts standards because by so doing they profited. Likewise, the large corporations followed the new standards when economic benefits accrued, but only then. As a critic from the machine tool industry told automobile industrialists in 1926, "You have carried standardization only to the point that suits your pocketbook." [59]

VI

The above account of the development of the S.A.E. standards program has stressed the economic advantages that encouraged intercompany standardization. But there did exist economic and technical considerations that deterred standardization. In some cases companies

[54] *S.A.E. Handbook; 1933 Edition* (New York: Society of Automotive Engineers, 1933).

[55] John A. C. Warner, "Quick Glimpses of S.A.E. Achievement," *S.A.E. Journal,* XXXIV (1934), 20.

[56] Chase, "S.A.E. Celebrates Its Silver Anniversary," *American Machinist,* LXXII (1930), 865–66.

[57] P. M. Heldt, "Tire Standardization," *Automotive Industries,* LX (1929), 431.

[58] B. M. Smarr, cited in "Standards Committee Session," *S.A.E. Journal,* XXVI (1930), 275–76.

[59] Forrest E. Cardullo, chief engineer of G. A. Gray Company (Cincinnati), quoted in *S.A.E. Journal,* XVIII (1926), 279–80.

not only ignored S.A.E. standards but violently opposed them. On occasion, opposition came from manufacturers whose patented designs were excluded by the adopted standards, but this was rare because of the extensive patent interlicensing organized in the industry after 1915.[60]

More vigorous opposition to intercompany standards came from suppliers, who faced an economic threat in the restrictions imposed by standard purchasing specifications. Manufacturers of bearings resented some of the close tolerances incorporated in S.A.E. standards.[61] Some wheel manufacturers during the early years of the program exerted considerable pressure against standards. They objected, the chairman of the society's Wheel Division suspected, "because they have not the equipment and machinery necessary to bring about the refinements" required by the standards.[62] Some oil refiners also opposed S.A.E. when standard viscosity ratings were adopted in the 1920's.[63]

The bitterest opposition to purchasing standards came from suppliers of steel. Many of them deemed S.A.E. chemical and dimensional standards for steel almost impertinent. As early as 1911 the issue came to a head when the representative of six leading steel producers protested the recommended steel specification standards at an S.A.E. meeting. Howard Coffin reported a "direct expression on the part of some of the steel makers that they could not see any benefit to them as manufacturers in giving [S.A.E.] any information along this line."[64] Steel makers and steel processors continued their unco-operative attitude for several years. After exploring the possibility of gauge standards for sheet steel, the chairman of the Sheet Metals Division of the Standards Committee reported in 1913 that steel producers were "unanimously of the opinion that nothing can be done and hesitate to cooperate." When asked, "Did you come to the conclusion that they like this kind of confusion?" the chairman replied, "I believe they do."[65] The attitude was epitomized by the sarcastic comment of a steel spring

[60] *S.A.E. Transactions,* VIII (1913), Pt. I, 68; *ibid.,* XI (1916), Pt. I, 371.

[61] "Fifth Report of Ball and Roller Bearings Division," *S.A.E. Transactions,* IX (1914), Pt. I, 53–55.

[62] W. P. Kennedy, quoted in *S.A.E. Transactions,* VIII (1913), Pt. I, 7; also, *S.A.E. Transactions,* IX (1914), Pt. I, 10.

[63] "Refiners Should Play Ball with S.A.E.," editorial from *National Petroleum News,* printed in *S.A.E. Journal,* XXII (1928), 673.

[64] Quoted in "Discussion of Iron and Steel Report," *S.A.E. Transactions,* VI (1911), 499–517; also, Heldt, "Tire Standardization," *Automotive Industries,* LXII (1930), 802.

[65] T. V. Buckwalter, quoted in *S.A.E. Transactions,* IX (1914), Pt. I, 42.

producer: "I say it is none of your business, Mr. Coffin, if I make my springs of pot metal. What is it to you if they carry a car and never break?" [66]

Such opposition to rational purchasing specifications, whatever its economic advantage to suppliers, was at best a delaying action. Automobile manufacturers supported most of the standards and imposed them on suppliers as purchases mounted. At the same time more enlightened suppliers co-operated in the attempt to systematize purchasing.

Another economic factor was far more instrumental in shaping S.A.E. standards. Each manufacturer had capital and equipment invested in the prevailing design of his product. Any design changes required by intercompany standards represented a financial threat. This issue was brought up in 1914 when an idealistic critic of the S.A.E. program complained that emphasis on parts constituted an unfortunate approach to standardization. Instead of parts, he suggested, the automobile as a unit should have been the starting point for standards. The critic suggested ten standard car sizes, each with a standard wheelbase, standard engine supports, springs, hubs, and radiator, and even a standard fuel feed. In this manner standardization ultimately would make possible the "ideal car." [67]

Whatever merits this proposal possessed, automobile companies would have none of it. They were often reluctant to make even slight changes in order to conform to S.A.E. standards. Cadillac consulting engineer E. E. Sweet said in 1914 that Cadillac had already set up many of its own design standards and that it could not adopt S.A.E. standards until other factors necessitated product redesign. Then they would follow S.A.E. where possible.[68]

Addressing the same problem, the chairman of the Truck Standards Division stated in 1912, "Of course, we recognize the amount of money that is invested at the present time in the truck industry, and in whatever recommendations we may have to offer finally we want to be sure that there is nothing of a revolutionary character involved . . . ." [69] Clearly, the fear of standards involving radical changes was great, for in them the manufacturer faced the danger of

[66] William H. T. Tuthill, secretary of Tuthill Spring Company (Chicago), quoted in *S.A.E. Transactions,* VI (1911), 101.

[67] Letter from Willis A. Swan in "The Automobile Engineer's Forum," *Automobile,* XXXI (1914), 76–77.

[68] Quoted in "Makers Save by Using S.A.E. Standards," *Automobile,* XXXI (1914), 77.

[69] W. P. Kennedy, quoted in *S.A.E. Transactions,* VII (1912), Pt. II, 70.

obsolescence. Only standards demanding moderate design modifications had much chance of being widely followed.

Conflict between standardization and design progress also complicated the establishment of S.A.E. standards. The most important advantage of standards was production efficiency and economy. Standards could, however, be disadvantageous. They might become a threat to design progress, for a product or part once standardized among many companies was not easily altered for a more advanced design. During the first years of the S.A.E. program, some engineers had suggested dimensional standards for such items as pistons and cylinders—all in the interest of production savings. Most S.A.E. members violently opposed such proposals.[70] One of them, later elected president of the society, commented, "If we are going to say what the bore or stroke of a motor is to be then there is not much chance for making any of the revolutionary changes made abroad recently."[71] Several companies had approached S.A.E. about standardizing flywheels, but Howard Coffin warned, "If you standardize the flywheel, I believe there will be no limit beyond which you might not go."[72] Likewise, the society was admonished to be wary in standardizing springs lest it incorporate features more suited to the horse buggy than to the automobile.[73]

With such fears extant, many suggestions for standards came to naught, and the most serious threats to design progress were avoided. But there was a borderland of S.A.E. parts standards where some engineers feared a danger to design progress existed. Detailed dimensional standards on parts such as clutch housings, axles, hubs, and body frames might stifle improvements.[74]

The issue was never greater than in 1921 and 1922, when S.A.E. attempted to standardize truck axles and hubs. C. T. Myers, representing Detroit axle and wheel manufacturers, saw the intercompany standardization of hubs and axles as the start of a very desirable course of action. Brake-drum dimensions, bearings, hub flanges, hub caps, and wheel fits could likewise be standardized. Then there were more possibilities with spindles and drive shafts, differentials, bevel gears, spur gears, and worm gearing. On the other side of the argument

[70] *S.A.E. Transactions,* VI (1911), 63, 328.
[71] Henry F. Donaldson, quoted in *ibid.,* VI (1911), 336.
[72] *Ibid.,* VI (1911), 696–98.
[73] Christian Girl, president of Perfection Spring Company (Cleveland), quoted in *ibid.,* VI (1911), 687.
[74] *S.A.E. Transactions,* VII (1912), Pt. II, 36, 47–48, 50–64.

over standardization, A. F. Masury, chief engineer of Mack Trucks, Inc., took violent exception to Myers' hopes. He sounded a clear warning. Too much standardization would impede the progress of design.[75]

Different business viewpoints underlay the issue. Manufacturers of wheels and axles, along with truck assemblers, wanted hub and axle standards in order to get production economies. Roller-bearing manufacturers also supported the standards, since they called for roller bearings. Ball-bearing manufacturers, especially the New Departure Company, opposed the standards.[76]

The tie-up between the different economic viewpoints and the standardization versus design-progress issue soon became explicit. In an open letter in *Automotive Industries,* Vice-President John Younger, of Cleveland's Standard Parts Company, admitted that as a parts manufacturer he would gain economies from hub and axle standards. On the other hand, as an engineer he saw possible harm to the industry, and he had a "lurking suspicion . . . that such standardization [might] lead eventually to loss of individuality." Younger felt that "as an engineer, and a member of the S.A.E., [he] should be asked to take a much broader view of the whole industry rather than a more intimate, selfish view of a small portion of it, namely wheel makers and makers of axles for sale to assemblers." Therefore, facing the conflict between economic and engineering motives, he chose to oppose the projected standards. Younger pointed out that vehicle manufacturers who made their own axles would not follow S.A.E. standards anyway, since no economic benefits would result. The real danger to design progress lay with the "assemblers," who purchased their parts from manufacturers of "specialized products." They would profit from hub and axle standards.[77]

If the standards desired by manufacturers who purchased most of their component parts were a threat to the progress of design in the truck industry, the same threat had been avoided in the passenger-car field, since small companies and "assemblers," along with detailed parts standards, had all but disappeared by the mid-twenties. At least as far as standardization was concerned, high production and the emergence of large corporations, in bringing about a new character to S.A.E. standards, had eliminated a potential hindrance to design

[75] "Myers Suggests Axle Standardization," *Automotive Industries,* XLVI (1922), 712–13.

[76] J. Edward Schipper, "Move to Unify All Interests in Hub Standardization Work," *Automotive Industries,* XLIV (1921), 592–94.

[77] Letter from Younger in *Automotive Industries,* XLIV (1921), 568–69.

progress. To be sure, the large corporations had their own standardization programs, but the task of changing a detailed part standard within a single firm was infinitely easier than that of getting many companies within the industry to agree upon any single change. Though all companies, large and small, were interested in design progress as well as production efficiency, the design progress had to occur within a context of technological and economic conditions. With the early small companies and the intercompany detailed parts standards, those conditions were less favorable.

VII

This survey of the intercompany standardization movement in the automobile industry has shown how the standards were originated by the industry's engineers during a period of acute economic distress and how the early standards were especially valuable to the smaller companies in their attempt to survive among the encroaching giant corporations. In showing how the character of the S.A.E. standards changed as the large corporations became dominant, the study provides a good example of how the evolution of technology reflects institutional conditions as well as advances in knowledge. Most histories of technology would benefit from similar attempts to find relationships between economic conditions and technological evolution.

The study also has hinted at the significance of the automobile industry's intercompany technical standardization for twentieth-century American industry. As automobile production has expanded, the influence of S.A.E. standards has spread into widening sections of the nation's industry. The steel, machine products, rubber, and petroleum industries have adopted S.A.E. standard specifications for use when supplying automobile manufacturers, and many other industries have voluntarily accepted other S.A.E. standards. The First World War accentuated interest in intercompany standards. The S.A.E. extended its membership, and its standards program, into the new aeronautical, tractor, marine, and diesel industries, and it co-operated with other engineering organizations in establishing the American Engineering Standards Committee, which later became the American Standards Association.[78] In the 1920's, with the encouragement of Secretary of

[78] Clarkson, "Government Transportation Plans," *Scientific American,* CXIV (1916), 582; *S.A.E. Transactions,* XI (1916), Pt. II, 55; *ibid.,* XII (1917), Pt. II, 76–78; *ibid.,* XIV (1919), Pt. I, 185–200; *American Standards Year Book; 1929* (New York: American Standards Association, 1929), p. 7.

Commerce Herbert Hoover, the nation's industries organized large numbers of intercompany standardizing agencies.[79] The S.A.E. program served as a pioneer example.[80]

A highly advanced level of technical co-ordination has been the result. Through intercompany technical standards a common language and common practices have been created. Manufacturers in Michigan order the same steels, from the same specifications, as do manufacturers in New York or California. Screw and bolt makers the country over manufacture according to the same basic S.A.E.–American Standards Association designs.[81] Efficient production and the efficient use of industrial products has resulted. From a technical viewpoint the nation no longer consists of a conglomeration of uncorrelated units.

Whether intercompany standardization has been able to keep pace with product differentiation resulting from new invention is open to question. Nevertheless, the achievements resulting from such standardization have been so significant as to lend considerable justification to the phrase—"the nation's industrial machine"—in describing the collectivity of American industry.

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[79] Herbert Hoover's enormously influential Committee on Elimination of Waste in Industry recommended in 1921 that "a nation-wide program of industrial standardization should be encouraged by government in cooperation with industry."—Committee on Elimination of Waste in Industry of the Federated American Engineering Societies, *Waste in Industry* (Washington: Federated American Engineering Societies, 1921), p. 32.

[80] In 1920 S.A.E. President J. G. Vincent, vice president of the Packard Motor Car Company, with some exaggeration, called American automotive engineers the progenitors of the standards movement the world over.—"Address of President J. G. Vincent," *S.A.E. Transactions*, XV (1920), Pt. I, 517–22.

[81] By 1928 the S.A.E. was co-operating with the American Standards Association on twenty-three different standardization projects.—*American Standards Year Book: 1929*, p. 71.

Philippe de Girard and the Introduction of Mechanical Flax Spinning in Austria

THE Industrial Revolution had begun to affect the Austrian textile industry by the beginning of the nineteenth century. First to feel the effects were the woolen industry and the new cotton industry, which soon had copies of the new English spinning machines in operation. In England adaptation of these machines to flax had been made by John Marshall at Leeds as early as 1793, so that flax was spun dry in successful competition with hand-spun yarn, but only in the coarser yarns up to No. 16.[1] However, similar attempts were not successful in Austria. The machines and processes were not so efficient as the English and could not compete with the cheap domestic hand-spun yarn. Because flax fibers are held together by a gum, they cannot be spun like cotton without excessive waste. Special treatment and machines had to be devised in order that flax might be spun in the range of numbers demanded by the market, and profitably. In the second decade of the new century efforts were being made in Austria, as elsewhere, to solve these special problems. Production of linen goods led all other industries in the monarchy. It provided a livelihood, wholly or in part, for thousands of families in town and country and constituted an important export. But the severe blows dealt by the Napoleonic Wars were followed by growing competition from more progressive linen industries in western Europe and especially from the rapidly growing and more easily mechanized cotton industry. The importance of the introduction of machinery in the Austrian linen industry as a means of meeting these threats to its very existence thus becomes apparent.

Following is a study of the establishment by the French inventor Philippe de Girard of a mechanical flax-spinning mill near Vienna in 1816 with the aid of the Austrian Government, of contemporary Austrian flax-spinning machines, and of how these inventions affected Austrian technological development. We shall attempt to answer several questions on the basis of available records. What led the conservative government of Austria to give substantial aid to a foreign

[1] John Horner, *The Linen Trade of Europe* (Belfast, 1920), pp. 253–56.

inventor? What part did De Girard and Austrian inventors play in the attempt to mechanize the spinning of flax? What influence did the industrial development of England and western Europe have on events in Austria?

I

Francis I continued Joseph II's policy of encouraging the introduction of machines. At times the government was more zealous than informed, as when it granted a ten-year exclusive concession in 1800 for the use of English spinning machines, to be built in the monarchy with the aid of an English mechanic.[2] The concession was canceled when investigation disclosed that some ten plants in Bohemia and Lower Austria already were spinning cotton by machines of English design.[3] Scarcity of labor and the rise in wages at the turn of the century stimulated an increase in requests for licenses to produce and use various labor-saving machines. And although there were then no flax-spinning machines in the monarchy, hand spinners expressed apprehension about the effect of the introduction of such machines on their means of livelihood. After some study it was decreed in January 1803 that all machine-spinning plants must secure governmental approval and that no concession for spinning flax by machine was to be granted until it was shown that workers would not suffer therefrom.[4] Many leaders, however, were convinced that increased use of machines would benefit national production greatly. As competition from English and Irish linens, using much machine yarn, and from machine-spun cotton steadily encroached on the markets for Austrian linens, practical interest in the mechanical spinning of flax grew. The valuable linen industry was in need of help, and the government, in a decree of May 1811, voiced a positive policy of all possible encouragement and aid in the introduction of flax-spinning machines throughout the monarchy.[5]

The first workable machine in Austria was invented in that same year by Franz Wurm, though a patent was denied in 1813 because

[2] Although England prohibited migration of skilled workmen and exportation of textile machines and plans, there was much evasion. Several restrictions were lifted in 1825 and the rest in 1843.

[3] Johann Slokar, *Geschichte der österreichischen Industrie und ihrer Förderung unter Kaiser Franz I* (Vienna, 1914), pp. 183–86.

[4] *Ibid.*, p. 186. This was merely a gesture of assurance, inasmuch as spinning was a free industry and machines could not be prohibited.—*Ibid.*, p. 366.

[5] J. L. Barth-Bartheheim, *Oesterreichische Gewerbs- und Handels-Gesetz Kunde* (Vienna, 1819), I, 54, and II, 363.

of defects.[6] Wurm's invention is said to have been stimulated by Napoleon's offer in May 1810 of a million francs to the inventor of a successful flax-spinning machine. The same offer led to the solution by Philippe de Girard of the basic problems involved. He studied the flax fiber under a microscope and only two months later took out a patent covering the fundamental principles of the wet method: (1) softening the gum by passing the fibers through a warm alkaline solution; (2) drawing out the fibers by a series of endless combs; and (3) washing the coarse yarn before the fine spinning.[7] The problem remained to build machines incorporating these principles.

With the aid of a clockmaker, De Girard produced a machine with twelve spindles which spun yarn of medium fineness. He also produced his second basic invention, ranges of needles on belts or drums to comb and draw the flax preparatory to spinning. In 1812 a plant with ten spinning machines was set up in Paris and in 1813 a second with ten improved machines of 108 spindles each. Both machines and product were carefully examined by Chaptal, director general of commerce and manufactures, and completely approved.[8] But before any award could be made Napoleon had fallen, and the government of the Restoration ignored the whole matter. Meanwhile, Cachard and Lanthois, former associates of De Girard, sold designs of his machines to Horace Hall, who took out an English patent in 1814.[9] De Girard had exhausted his resources in the development of his process, which, though producing yarn of good quality, was still too costly to compete well with the hand spinner. It was at this point that De Girard, hoping to save his associates from ruin and to be able to develop his invention further, accepted the proposal of Emperor Francis to establish a mechanical flax-spinning plant in Austria.

This proposal was an expression of the policy set forth in the decree of 1811 and further emphasized in this declaration by the Hofkammer in 1815:

[6] President Stahl of the Hofkammer to Emperor, November 26, 1816, Hofkammer Archiv, Commerz-Cammer, Fasc. 1143, No. 37 ex January 1817. Hereafter this documentary source is cited as HKA, Com.-Cam.

[7] Charles Ballot, *L'Introduction du machinisme dans l'industrie française* (Lille, 1923), p. 234. The primary flax fibers are only about two inches long but are held together in lengths of one and one half to over two feet by a natural gum. When this gum is softened properly the primary fibers slip on each other and thus can be drawn out effectively in the spinning process.

[8] Charles Ballot, "Philippe de Girard et l'invention de la filature mécanique du lin," *Revue d'histoire économique et sociale* (1914–19), pp. 155–58.

[9] Letter of Philippe de Girard in the *Manchester Guardian* of December 2, 1826, quoted in Horner, *Linen Trade of Europe*, p. 336. De Girard gives the date as May 1815, but Horner (p. 334) gives 1814.

The former objections of the government to the erection of labor-saving machines, based on the apprehension that the poorer classes who live by handwork would be deprived of their livelihood, now deserve neither consideration nor mention, in view of the progress already made by domestic industry and the development and expansion of which it is capable, in view of the necessity for cheaper and more widespread production of manufactured goods in order to be able to compete with foreign lands, and in view of the lack of workers, which, after many years of bloody wars, curtails all branches of industry.[10]

In a letter to the Emperor, who, with Prince Metternich, was in Paris in the fall of 1815, De Girard requested a concession and loan for building a model plant.[11] Francis was so impressed by the reports of his investigators that he granted De Girard a concession on September 15, 1815, "for the building and sale of his flax-spinning machine in my states for ten years on the condition that he produce such machines within one year, and, if these show good results, I will give him proper aid in the erection of a flax-spinning plant equipped with his machines." [12] To avoid the delay involved in constructing machines in Austria a set from his shop in Paris was purchased.[13] A loan of 40,000 francs for expenses was granted also, as Metternich put it, "in order not to lose the opportunity to enrich the national industry with such an important invention." [14] The machines, transported by army vehicles, arrived in Vienna in December and Hofkammer and Chancellery were ordered to provide a suitable location in or near the city.

Finding a satisfactory site consumed much time after De Girard's arrival, but finally a pleasant one, with usable buildings and a small stream for power, just south of Vienna at Hirtenberg was selected. In September the Hofkammer voted loans of 45,000 florins W.W. for its purchase and an equal amount for alterations and equipment, both sums to be repaid within ten years.[15] Water power was installed and

[10] HKA, Com.-Cam., Fasc. 1114, No. 7 ex April 1815. The Hofkammer was the body charged with oversight of commercial affairs.

[11] Copy, De Girard brothers to Emperor [September 1815], HKA, Com.-Cam., Fasc. 1114, No. 72 ex October 1815.

[12] Copy, Emperor to Metternich, September 18, 1815, *ibid.*

[13] "Nottes sur le project . . . de MM de Girard . . . ," HKA, Com.-Cam., Fasc. 1114, No. 78 ex February 1816.

[14] Copies, Baron Vincent to Metternich, October 13, 1815; Metternich to Emperor, October 15, 1815; Metternich to von Hudelist, November 16, 1815; Emperor to Metternich, October 24, 1815, *ibid.*

[15] See Nieder-Osterreichisches Landes-archiv, A Index, 1816, "Girard," pp. 14, 18, and 20. Cited hereafter as N-O-A, A Index. During the wars, large issues of paper florins to finance operations caused a great fall in their value. When reform began in 1816 the florin was given a value in C.M. of forty per cent of face. Paper florins were labeled Wiener Währung, or W.W. Florins C.M. were metallic florins, "Convention Money," coined under a convention with the Elector of Bavaria. One florin C.M. was equal to about forty-eight cents.

the machines began operating in January 1817, a full year after De Girard's arrival. By mid-February thirty-four persons were employed, including six woodworkers and locksmiths and four apprentices.[16] The Emperor himself, accompanied by his three brothers, the Prince and Princess of Bavaria, and the Princess of Brazil, visited Hirtenberg and declared his satisfaction with the enterprise.[17]

II

Most attempts by Austrians to invent flax-spinning machines were not very fruitful. Too often they applied for a patent or subsidy without a basically new idea or before their machines were properly developed. The patent system under the law of 1810, furthermore, was inadequate. Political rather than technical authorities made decisions on patents, with frequently unsatisfactory results, although after 1817 the judgment of the recently founded Polytechnic Institute was to be secured on all mechanical inventions.[18] It was probably due in no small degree to the interest aroused by the De Girard enterprise that several persons applied for patents and subsidies on flax-spinning machines in 1816. Among these were Johann Aichinger and Philipp Hebenstreit, whose first machine was inoperable, but who received a patent in 1818 when experts reported fair results from their improved machine.[19] Another unsuccessful applicant was Hermann Leitenberger, prominent Bohemian linen and cotton manufacturer, whose plans (no model was submitted) revealed merely the principles found in cotton-spinning machines. The machines of Franz Wurm and of De Girard showed essential differences from cotton spinning, and the product of their machines was much superior.

After Wurm, who became De Girard's chief rival in Austria, was refused a patent, as we noted earlier, he became associated with Leopold Pausinger, an imperial councilor. In 1816 these native sons applied for patents on machines for preparing and spinning flax and tow. A provincial commission reported that only the flax-spinning machine met requirements for a patent, but that this machine excelled De

[16] Commissions Protokoll, February 15, 1817, HKA, Commerz-Commission, Fasc. 1223, No. 275 ex March 1817. Hereafter this documentary source is cited as HKA, Com.-Comm.

[17] Ballot, "Philippe de Girard . . . ," *Revue d'histoire economique et sociale*, p. 161.

[18] Barth-Barthenheim, *Oesterreichische Gewerbs-* . . . , II, 401–3. The Polytechnic Institute in Vienna was founded in 1815.

[19] HKA, Com.-Comm. Fasc. 1238, No. 65 ex November 1818; *ibid.*, Fasc. 1223, No. 97 ex October 1820.

Girard's in many respects. The speed was much greater and the yarn finer and stronger. No preliminary spinning machine was necessary, while De Girard used three. Wurm's machine was cheaper and could be used in the home, while De Girard's could be used only by large manufacturers. President Stahl of the Commerz-Hofcommission [20] was impressed by the report, and a patent for ten years was authorized in April 1817. But for some reason Stahl delayed issuing the patent. At this time De Girard's enterprise was being investigated also, and we cannot be sure whether Stahl suspected that the experts' report on Wurm's machine was unsound or whether he delayed the patent because of the rivalry between the inventors and their supporters among the officials. It will be recalled that political authorities made decisions on patents, though with the advice of experts. Whatever the reason, a new investigation of Wurm's machine was ordered. It came as a surprise when Pausinger testified that the machine reported on so favorably the year before was not satisfactory and had been destroyed. The partners now submitted a new set of two preliminary and one fine-spinning machine of forty-two spindles. The essential differences between this system and De Girard's lay in the preliminary spinning machines and in the fact that in De Girard's system the flax was wet before both the preliminary and the fine spinning while in Wurm's it was wet only before the fine spinning. After some delay a full set of Wurm's machines was given a test run in July 1817, when they produced yarn of medium quality. Although two or three members doubted that a patent was warranted, the commission recommended the grant, and a patent was issued in November 1817.[21]

III

While De Girard was establishing his enterprise in Austria, the pressing question of how best to revive the linen industry there was discussed widely. The Austrian cotton and woolen industries enjoyed prosperity during the Continental blockade, but the linen industry, dependent on export trade, suffered heavily. There was some recovery by 1815, but a new decline began the next year. Formerly Bohemia

[20] The Commerz-Hofcommission was established in July 1816 to handle industrial and commercial affairs, with Philipp von Stahl at its head. It was abolished in 1824, and the Hofkammer resumed responsibility in these fields.—Barth-Barthenheim, *Oesterreichische Gewerbs- . . .*, III, 72.

[21] Commerz-Hofcommission to Emperor, October 16, 1817, and reply of Archduke Rainer, November 8, 1817, HKA, Com.-Cam., Fasc. 1143, No. 188 ex March 1818.

sent considerable amounts of linen to Italy for export to Turkey and England and to Spain for re-export to her colonies. But after the wars English control of the Mediterranean hampered trade with Turkey and revolutions in South America blocked attempts to establish direct trade there. Moreover, English wares—linen, cotton, and mixed goods in imitation of Bohemian and Silesian linens—were winning Austria's Continental markets. Competition from cotton became ever stronger as its lower price and general usefulness brought increasing acceptance by all classes. Linen exports fell to a low point in 1820.[22] The tariff on linen yarn, increased in 1812, was removed in 1818, though importation of manufactured linens was still prohibited. But neither this nor the inclusion of Austria's Italian provinces in her tariff district helped much.[23]

A significant factor in the situation was the rapid development in England, France, and Belgium of machines and techniques. Christian Erxleben, a prominent Bohemian linen merchant, gave his views on the situation to the government in 1816. Only very low wages, he wrote, had enabled manufacturers to meet the competition of England and France, but now these countries were forging ahead because of the use of spinning machines. To meet this threat Austria, too, must introduce machine spinning, for better and cheaper yarn is the basis of cheaper linen. Director Prechtl of the Polytechnic Institute agreed and recommended the French plan of purchasing rights to a machine and allowing anyone to copy it. The government should then aid in establishing flax-spinning plants. Von Allstern, chief of the Factory Inspection Bureau, thought that cheaper linen must come through cheaper food and flax and that introduction of spinning machines might safely be left to private industry.[24]

In subsidizing De Girard's enterprise in Austria the government had sought to ensure the spread of flax-spinning machines in the monarchy. But the prospect that the venture would soon become self-sustaining was not bright. Hardly had his machines begun operating before De Girard wrote the Emperor that he must have further financial aid. He requested 36,000 florins W.W. for operating, to be repaid by setting aside one hundred pieces of linen monthly, and

[22] Stephan Ritter von Keesz and W. C. Blumenbach, *Systematische Darstellung der neuesten Fortschritte in den Gewerben und Manufacturen . . .* (Vienna, 1829), I, 176.

[23] Karl Hudeczek, *Österreichische Handelspolitik im Vormärz 1815–1848* (Vienna, 1918), pp. 45–46.

[24] HKA, Com.-Cam., Fasc. 1114, No. 6 ex July 1816; "Note," September 21, 1816, *ibid.*, Fasc. 1143, No. 25 ex January 1817.

20,000 florins W.W. for a second set of machines, to be secured by the machines and payable within ten years.[25] Officials of Lower Austria reported unfavorably on the requests. However, realizing that implementation of the government's policy was at stake, the Commerz-Hofcommission set up a commission of experts to examine the whole enterprise in respect to its finances, its success in spinning, and the most effective means of spreading the use of De Girard's machines. It reported on April 9, 1817, that one set of three preliminary and ten single fine-spinning machines of fifty-four spindles each was in operation. There were also five winding machines, two carding frames, and two looms. A large water wheel furnished power. Twenty-seven pieces of unbleached linen, a quantity of flax, and some 450 kilograms of spun yarn were on hand, besides a considerable amount of yarn at outside weavers. Both machines and product received the commission's approval.

Findings on other matters were not so encouraging nor were opinions so unanimous. Asked about marketing his machines, De Girard replied that for adequate demonstration he needed four more sets in operation. He could prepare for these if the balance of the alterations fund were available, though for their actual construction he would require 50,000 florins C.M. Then as soon as the expanded plant became profitable he would begin building sets for sale. This was not a promising prospect, but the commission could do no more than suggest that the government could either support De Girard until he could build machines for sale or cancel his concession and permit anyone to build the machines. While it believed the first plan the more economical for the state, it hedged by adding that, all things considered, it might be more advantageous to adopt the latter course. The loan of 36,000 florins W.W. was advised, since to cease operation would place the whole venture in an unfavorable light. Erxleben, a member, agreed that De Girard should receive aid, but only if he produced yarn and not cloth. Then, in view of the distress in the industry and perhaps with the spinning schools of the Theresian period in mind, Erxleben proposed that the state devote 250,000 florins C.M. to the establishment of ten machine-spinning plants, each equipped with three sets of De Girard's machines, in the highlands of Bohemia and Moravia, home of the linen industry. He believed that successful

[25] Report of the district below the Vienna Woods to the Government of Lower Austria, February 19, 1817. HKA, Com.-Comm., Fasc. 1223, No. 275 ex March 1817.

demonstration there would be the most practical means of securing production of cheap machine yarn quickly.[26]

The Commerz-Hofcommission itself proposed a system of premiums to stimulate De Girard's production of machines, and this the Emperor approved. A premium of 1,000 florins C.M. per set sold domestically was established, De Girard to receive one half and the other to apply on his debt to the state. Accepting these terms, he received the 22,000 florins W.W. remaining in the plant alterations account and 3,000 florins C.M. as an advance on the first six sets.[27]

The shop for building machines was ready late in 1817, and a commission was placed over that phase of the business. A circular was distributed advertising De Girard's machines, one of which, it was stated, could produce 900,000 ells of No. 12 to No. 35 or No. 40 yarn in eleven hours.

De Girard's plant soon had two sets of machines for flax and one for tow, together with the necessary preparatory and preliminary spinning machines.[28] His yarn was used principally for warp. Heitzmann of Brana, Moravia, was reported in 1819 as using it on one hundred looms.[29] The finest yarns could not be spun by machine, though De Girard spun higher counts than his rivals. Normally he spun from No. 18 to No. 50 or No. 60, and occasionally to No. 100, while Wurm spun to No. 53. The usual range in England at this time was from No. 36 to No. 40. Informed writers testified to the fineness, uniformity, and beauty of De Girard's yarn relative to the usual hand-spun product. Yet the fact remained that there was too large a proportion of waste in De Girard's machine spinning to permit him to hold his own against the cheaper hand-spun yarn of the same count.[30]

[26] Commissions Protokoll, April 9, 1817, HKA, Com.-Comm., Fasc. 1223, No. 129 ex July 1817. An accompanying *Projekt* gave details of the plan.

[27] Commerz-Hofcommission to Emperor, May 23, 1817, and imperial decision of July 10, 1817, HKA, Com.-Comm., Fasc. 1223, No. 23 ex August 1817.

[28] S. v. Keesz, *Darstellung des Fabriks- und Gewerbswesens* . . . (Vienna, 1824), I, Pt. II, 60.

[29] J. Prechtl, *Jahrbücher des k.k. Polytechnischen Institutes in Wien.* (Vienna, 1819), I, 389.

[30] Letter, De Girard to Charles Coquelin, September 20, 1839, quoted in A. Renouard, *Études sur le travail des lins* (Lille, [n.d.]), I (4th ed.), 41; Louis Orth, *Ueber die mechanische Flachsspinnerei in Deutschland* . . . (Vienna, 1841), pp. 22, 46; Friedrich Breunlin, *Ueber mechanische Leinen-Spinnereien* (Stuttgart, 1838), p. 44. It is of interest to note that in preparing flax English factories were reported as getting 75 per cent pure flax, 20 per cent tow, and 5 per cent waste. Wurm's system yielded 40, 41, and 19 per cent respectively, while De Girard's yielded 62½, 25, and 12½ per cent. Orth, *Flachsspinnerei*, p. 20.

IV

It will be recalled that Wurm and Pausinger received a patent on their system in November 1817. In building their hackling machine, however, they used a feature patented by De Girard, who won a suit for infringement in 1819.[31] Though their patent was canceled, they secured another on an improvement in December of that same year.[32] There was further litigation, which aroused bitterness and affected both enterprises adversely. Like the De Girard plant, that of Wurm and Pausinger operated with fair success for a time. In 1820 their system comprised ten machines for preparing and spinning flax and tow. They built machines for sale, and in 1825 their factory at Marienthal, with some 120 workers, had sixteen fine-spinning machines producing medium counts of good quality.[33] By 1827, however, there had been a number of setbacks that added up to failure. They had abandoned their wet process, and the excessive waste in the dry spinning prohibited profits. The yarn produced, though cheaper than English machine yarn, could not compare with it in quality; while comparable with hand-spun yarn in quality, it could not compete with it in price.[34]

De Girard seemed always short of funds. He was a poor administrator, plant profits were tenuous, and his experiments with new inventions absorbed his resources.[35] His request in 1819 for a state loan of 25,000 florins C.M. was refused a year later and the plant was closed for some time.

The location of the plant at Hirtenberg, far from the chief flax-growing and linen-producing regions of the monarchy, imposed high transportation costs on De Girard. Lack of skilled labor and difficulties in marketing were other factors contributing to the failure at Hirtenberg. Furthermore, even with ingenious protective works De Girard was unable to prevent damage to the plant from floods. He had just resumed operations in 1824, with linen trade showing increased ac-

[31] HKA, Com.-Cam., Fasc. 1143, No. 2 ex March 1825.

[32] Von Stahl to Emperor, November 1, 1821, HKA, Com-Cam., Fasc. 1143, No. 35 ex November 1821; N-O-A, A Index, 1819, "Girard."

[33] Keesz and Blumenbach, *Systematische Darstellung . . .*, I, 109–10.

[34] Breunlin, *Ueber mechanische . . .*, p. 45; Orth, *Ueber die mechanische . . .*, p. 27.

[35] Descriptions of several of De Girard's machines are in J. Prechtl, *Technologische Encyklopaedie* (Stuttgart, 1835), IV, 218–38.

tivity, when another flood caused such extensive damage that the plant was forced to close again.[36]

This was virtually the end of De Girard's venture at Hirtenberg. In January 1825 he was offered the position of Chief Engineer of the Mines of Poland, with full opportunity to develop his inventions for the benefit of Polish industry. His plant ruined and capital dissipated, with no further financial aid from the state in prospect, De Girard accepted the post.[37] Still hoping, however, that his Austrian enterprise might be revived, he requested extension of his concession and consideration of his debt of about 30,000 florins as part of the promised subsidy on the sale of his machines.[38]

One is constantly impressed, in reading through these negotiations, with the "too-late-ness" of Austrian officialdom. Not until two years later were officials directed to report on means of protecting the state's interests. They found the plant, idle for three years, in a deplorable state and all supplies disposed of. They reported that there was no prospect of resumption of operations.[39] In March 1828, Count Nadasd, minister of finance and president of the Hofkammer, sent the Emperor his conclusions. Legally the concession could not be extended. The loan might well be, for if De Girard moved his business to a linen-producing center and there was careful management, something might be recovered. Five months later the Emperor extended the loan for five years on the security of realty and machines. There were to be no more advances from the state.[40]

De Girard never returned to Austria. The Austrian consul at Warsaw reported early in 1830 that he found him spinning flax on machines similar to those at Hirtenberg and weaving by an automatic loom he had recently invented. De Girard had again declared that he would return to Austria as soon as circumstances permitted and promised to write about reopening the mill.[41] Perhaps he was sincere in his

[36] Commerz-Hofcommission to the Government of Lower Austria, June 17, 1821, HKA, Com.-Comm., Fasc. 1223, No. 87 ex June 1821; Keesz and Blumenbach, *Systematische Darstellung . . .*, I, 108; N[illegible]A, A Index, 1824, "Girard."

[37] Gabriel Desclosières [illegible] *et inventions de Philippe de Girard* (Paris, 1858), p. 71. One of his first assignme[illegible] was a journey to England to learn about technological developments and the state of ind[illegible]y there.

[38] De Girard's es[illegible]ate, probably low, in October 1825. His debt is given as 47,820 florins 1 kreutzer C.M. i[illegible] "oposals of the Hofkammer to the Emperor," September 28, 1827, HKA, Com.-Cam., Fasc. 1[illegible]5, No. 179 ex September 1827.

[39] *Ibid.*

[40] HKA, Com.-Cam., Fasc. 1115, No. 36 ex September 1828.

[41] Oechsner to Count Nadasd, February 23, 1830, HKA, Com.-Cam. Fasc. 1115, No. 146 ex July 1830; No. 59 ex October 1830.

intentions, but his interest now was focused on his operations in Poland, which, although not up to his expectations, were successful. The plant at Hirtenberg and the remaining equipment was sold at auction in 1835 for 4,920 florins.[42]

V

How can we explain the failure of this Austrian venture by the discoverer of the basic principles of spinning flax by machine? He had produced the best machine yarn in Austria but not at a price to compete with imported machine yarn of the lower counts or the finer grades of domestic hand-spun yarn. He had not met expectations in spreading his machines, though he did scatter a number of them —just how many we cannot determine—through the monarchy and in neighboring regions.[43] This is not an impressive showing for ten years of work with substantial state aid. The reader will have discerned some of the reasons why it was not better: De Girard's character, the ineffectiveness of the Austrian Government of the time, and the state of Austrian economic development relative to that of England and western Europe. De Girard's inventive genius cannot be questioned. But he was too much the restless inventor, with new projects taking effort needed to perfect the old. He was especially inept in finance —though the record makes it clear that government officials often were to blame—and failed to manage funds with even average efficiency.[44] The government must certainly share the blame, for while it had definite goals in view, it lacked vigor and understanding in helping De Girard achieve those goals.

De Girard's interest in social life, incidentally, probably contributed to his failure in business. He enjoyed Viennese society and had pleasant contacts with members of the royal family, for whom he painted miniatures. Jerome Bonaparte tarried in the vicinity for a time, and the former Queen of Naples lived nearby. De Girard "found in this little court of exiles the charm of chateau life and almost a family life."[45] Some years later he wrote his brother that failure was due

[42] Slokar, *Geschichte der österreichischen . . .* , p. 193. There had been further damage from floods in 1829, HKA, Com.-Cam., Fasc. 1115, No. 118 ex August 1829.

[43] Renouard, *Etudes sur le travail des lins*, p. 58; Desclosières, *Vie et inventions de Philippe de Girard*, p. 67.

[44] Erxleben said De Girard's calculations of profits from a proposed expansion of his plant were overly optimistic and that he was promising himself "golden mountains." HKA, Com.-Comm., Fasc. 1223, No. 129 ex July 1817.

[45] J. J. Ampère, *M. Philippe de Girard* (Paris, 1847), p. 9.

to "our constant effort to perfect machines; our persistence in guarding a serious worker; our persistence in preserving the pleasant retreat where we have passed ten years. . . ." [46]

Meanwhile English linen manufacturers were not emphasizing "pleasant retreats." In the fight against cotton they were developing mechanical processes enabling their flaxen yarn to win markets abroad, even in Austria itself. Mechanical spinning of coarse linen yarns was a commercial success in England as early as 1791. It was the adoption of De Girard's method of drawing that enabled English factories after 1815 to produce yarns of medium counts and thus encroach further upon the markets for hand-spun yarn.[47] For some unexplained reason, however, De Girard's basic process of wetting the roving before the fine spinning, as practiced by him in France and Austria, was not adopted then by the English. They spun dry until 1825, when James Kay introduced the system of wet spinning that De Girard, on a visit to England at the time, claimed as his own. The judicial decision was that Kay's method of soaking the roving in water for six hours was different from De Girard's method of wetting and therefore patentable.[48] Our interest, however, is in the fact that the new process, making possible the production of fine yarn by machine, was rapidly adopted in England and then spread to the Continent. English machine makers, adopting De Girard's basic principles plus numerous ingenious improvements, and with the advantages of an active industrial community and good markets, turned out better machines than did De Girard or the Austrian inventors. One who examined De Girard's machines "most closely" in 1828 wrote that the English preparatory machines were better and the new system of wetting the rovings before the fine spinning was more efficient than De Girard's.[49]

De Girard probably would not have been successful even in Bohemia or Moravia. Few basic factors would have been altered. The whole Austrian economy was backward, and financial troubles had plagued it since the Napoleonic Wars began. Mechanized production in western Europe and the relentless competition of cotton steadily won Continental and other markets from Austrian linens. Cheapness of labor in the monarchy delayed transition to machines. Attitudes of workers

[46] Ballot, "Philippe de Girard . . . ," pp. 163–64.

[47] See De Girard's comments quoted in A. Melon, *Le Chevalier Philippe de Girard* (Caen, 1889), pp. 58–59.

[48] On this, see Horner, *The Linen Trade of Europe*, pp. 261–65 and 334–39. He states (p. 337) that De Girard "was enabled to spin finer yarns with something like a four-inch reach."

[49] Orth, *Ueber die mechanische . . .*, p. 7.

and employers also played a part, and there is much truth in the declaration of one witness that "it is the unchangeableness and indolence of the dwellers in the mountains and their unparalleled ignorance of conditions beyond the borders of their province that is the cause of the decline of the linen industry." [50]

It is clear that such conditions would not stimulate the purchase of costly machines such as De Girard's that could not meet the competition of hand-spun yarn. As late as 1836 Kreutzberg wrote that machine spinning was not yet attempted to any extent in Austria and that, in view of the situation, it might not be accepted generally for a long time.[51] And yet, though a relatively small number of De Girard's machines had operated in the monarchy, the conclusion is justified that his venture, and those of the Austrian inventors as well, drew attention to both problem and solution and definitely prepared the way for the introduction of new English machines. Large amounts of English machine yarn were exported to the Continent following adoption of the improved wet spinning after 1825, and both quality and price ensured victory over hand-spun yarn. Here was convincing justification, still largely lacking in De Girard's time, for the introduction of machines. Only a few years after Kreutzberg wrote, English machines, following De Girard's principles but greatly improved, began to operate in the monarchy, opening a new chapter in the history of the Austrian linen industry.

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[50] Quoted by P. Benaerts, *Les origines de la grande industrie allemande* (Paris, 1933), p. 473.
[51] Quoted by Slokar, *Geschichte der österreichischen . . .* , p. 375.

Speculation in the Revolutionary Debt: The Ownership of Public Securities in Maryland, 1790

HISTORIANS have taken it for granted that the Revolutionary debt was fairly well concentrated before it was funded in 1790, but they have not been able to support this view with concrete evidence. Most of the people living at the time thought the same thing but were likewise unable to prove it. The truth could not be known until Hamilton's funding operation assembled the securities that made up the debt. Under the act of 1790 a new federal loan was instituted. Various kinds of securities representing unpaid claims against the government were taken as subscriptions and the possessors given new federal stock. As nearly all the old securities came in, the government had full information about the transfer and ownership of the Revolutionary debt. The details, however, were not made public. Later, a succession of fires in the treasury destroyed nearly all the central records. Documents now existing, though voluminous, are scattered, incomplete, and hard to interpret. Historians have not made much use of them. For this reason, the ownership of the debt, which was a question in 1790, is a question still.

Fortunately, the records for Maryland are exceptionally complete. They give the name of the original holder of each security as well as the name of the person who held it in 1790.[1] Supporting documents remove many uncertainties that would otherwise exist. It is possible to make a statistical analysis of securities totaling over $900,000, an amount far greater than any for which we have had detailed information. Moreover, as this is the whole subscription of private individuals in Maryland, it constitutes a definable segment of the federal debt.

[1] Unless otherwise cited, all statistics in this paper are computed from two subscription registers for the period October 7, 1790, to February 26, 1793. Subscriptions toward a loan to the United States as proposed by the Act of Congress of the fourth of August 1790 in the office of Thomas Harwood, commissioner of loans in the State of Maryland, "Old Loans," Record Group 53, National Archives. A small ledger with the same title summarizes each subscription in a single entry and indicates whether the individual who actually brought the securities into the Maryland loan office was acting for himself or as an agent. In every case the name of the actual owner, not the agent, is entered in the two volumes that constitute the formal subscription register.

The analysis reveals a degree of concentration and transfer that is greater, probably, than is commonly supposed. One must introduce two qualifications, however, before coming to any general conclusions on the basis of this material. First, the securities held by private individuals in Maryland were only a fraction of the federal debt throughout the nation. Private subscriptions were smaller than they might have been, because during the Confederation the Government of Maryland, like several other state governments, assumed some federal securities as a state debt and accepted others for taxes or for purchases of state-owned land.[2] In this way the Maryland Government became the owner of $818,000[3] in federal securities, and these have to be eliminated from our study because one cannot tell whether or not they had been transferred out of the hands of the original owners at the time they were acquired by the state. It is only the securities remaining with private individuals that will be considered here, and while these amount to $903,000, they constitute only a fraction of the federal debt privately owned in the United States. Thus, we are dealing with a sample, and the second question is whether it is a fair sample.

No really satisfactory answer can be given until studies are made for other states. It should be said, however, that Maryland was not an exceptional case. The securities involved were exactly like those held in other states, issued under the same conditions, and to the same general classes of people. As already noted, many of the states "adopted" federal securities during the Confederation and made some kind of provision for those held by their own citizens. Whatever the states did along these lines affected the value of federal securities and, it might be argued, influenced the degree to which they were bought and sold locally. In that case, the picture in Maryland might differ from that in other states. We do not have nearly enough information, however, to weigh the factors that influenced trade in securities throughout

[2] See E. James Ferguson, "State Assumption of the Federal Debt During the Confederation," *Mississippi Valley Historical Review*, XXXVIII (December 1951), 403–24.

[3] All figures on the subscription to the federal loan of 1790 include accumulated interest. The figures have been calculated on the basis of a dollar of 100 cents instead of the dollar of 90 cents in use at the time. This will result in discrepancies of no more than a few cents, except where extended calculations have been made. In no instances, however, will the difference amount to more than two or three dollars.

Maryland's securities were subscribed on April 1 and September 23, 1791, by Benjamin Harwood in his own name, acting as a state agent. It appears that the state also held other federal securities. On November 29, 1791, a committee of the legislature reported that the state owned $973,035 in federal stock. Votes and Proceedings of the House of Delegates of the State of Maryland, November Session, 1792, Rare Books Division, Library of Congress.

the United States. In the meantime, there is no outstanding reason to believe that the concentration and transfer in Maryland was not at least fairly typical.

Several different kinds of securities were subscribed to the federal loan of 1790. At the head of the list in status and the regard always shown for them by Congress and state legislatures were the war bonds called "loan-office certificates." In theory, these represented voluntary loans of money to Congress during the fighting years of the Revolution. Actually, large amounts had been issued in payment of debts to merchants and others at times when Congress had no money.

Loan-office certificates were concentrated from the first. About 1,000 persons took them out originally in Maryland, but 69 individuals had nearly 60 per cent of the total amount.[4] In 1782 the state invited her citizens to turn over their certificates to the government and receive state securities in their place. By this means the state acquired holdings of loan office certificates and in 1790 subscribed $271,459 to the federal loan. Private individuals subscribed $172,270.[5]

The largest single item of the federal debt in Maryland consisted of army certificates issued after the war to officers and soldiers of the Maryland line.[6] Officers received up to four securities in lieu of back pay. These ranged as high as four or five hundred dollars each, though most were smaller. The officers also got a bonus in commutation of the half-pay pensions Congress had promised them during the war. The bonus certificates varied in amount, but it appears that lieutenants got $1,500 to $1,600, captains $2,360, majors $2,950, colonels $4,425, brigadier generals $7,375, and generals $9,794. A good many officers

[4] Register of Loan Office Certificates issued in the State of Maryland from the opening of the office till the first day of May 1781, when the issues ceased, "Old Loans," Record Group 53, National Archives.

[5] *Laws of Maryland made since M,DCC,LXIII* . . . (Annapolis, 1787), November Session, 1782, chap. 25. State holdings were evidently larger than the amount noted. It was reported in 1787 that the state had loan-office certificates whose principal value was $214,712, whereas the principal value of those subscribed in 1790 was only $166,428. Perhaps the state had disposed of these securities, but it is more probable that the securities had been issued in other states originally and were subscribed by Maryland directly at the federal treasury. Votes and Proceedings of the House of Maryland (n.d., n.p.), May 2, 1787; Maryland House of Delegates to Their Constituents, 1787, Broadside Collection, Portfolio 28, No. 24, Rare Books Division, Library of Congress. See also above, note 3.

[6] These were called either "Pierce's notes" or "final settlement certificates." Commissioner of Army Accounts, Pay Account, 1784–98, Maryland Hall of Records, Annapolis. This account is not complete for the whole payment to the Maryland line.

Securities were issued by federal commissioners to detached corps not connected with any state line, but the amount of these given to Marylanders and subscribed to the federal loan in Maryland has not been identified as a separate item.

had securities aggregating two or three thousand dollars and often more.

Most of the army certificates, however, were issued to enlisted men, whose individuals holdings were small. The four securities they might receive for back pay were for amounts like $43 or $80. The soldiers also drew a bonus security of $80. Altogether, their individual holdings were seldom more than two or three hundred dollars and usually less.

Private trade in army securities went on after 1783 as these securities were issued by agents acting under the direction of the federal paymaster general. The state accepted them from individuals in the sale of confiscated estates and ultimately got possession of $529,863. Those remaining in private hands and subscribed in Maryland to the federal loan amounted to $498,525.

Another type of federal security had its origin in certificates first issued to farmers, teamsters, and other civilians during the last years of the Revolution, when Continental armies in the field subsisted by impressment. These certificates, most of which were given out by officers of the quartermaster and commissary departments, were transferred during the war years, although the extent is unknown. Maryland, like other states, absorbed a good many by accepting them for taxes. After the war, however, Congress got around to issuing new certificates to the present holders of the notes still outstanding.[7] The original list of these civilian certificates, as we shall call them, is not available for Maryland, but it appears from those subscribed in 1790 that most were for small amounts, like $5 or $10 or $30, with here and there a notable exception. In any event, they were not numerous in the state by 1790. The Maryland Government subscribed only $9,746 to the federal loan, while private subscriptions were $27,644.

More important was the federal debt arising from "indents." This originated during the Confederation. Unable to pay interest on its growing obligations, Congress allowed the states to issue certificates of interest, or indents, to federal creditors.[8] The amount became very considerable. Private individuals in Maryland subscribed $172,521 in

[7] These were called "final settlement certificates" or referred to according to the name of the commissioner who issued them. Only the transfers occurring after 1783 can be traced from the records.

[8] During the Confederation, federal creditors in most states could, if they wished, draw interest on their securities in indents. These indents were subscribable to the federal loan of 1790. If the creditors had not collected interest in indents, they were credited with the accumulated interest on the securities they subscribed in 1790. No interest, however, was paid on indents.

indents to the federal loan, while the state subscription in 1790 was $4,599.

Aside from miscellaneous securities[9] that were not important in Maryland, the only other federal debt of consequence stemmed from emissions of paper money during the war. Most of the old depreciated Continental money was taken up by the states before 1790. Another fraction simply disappeared. In 1790 Congress agreed to take whatever remained in private hands at the rate of 100 Continental dollars to one specie dollar. Some $2,549,000 was offered by Marylanders, of which the real value was $29,549. The state subscribed an amount valued at $2,399.[10]

A study of the Maryland subscription register discloses that by 1790 all these different securities not absorbed by the state were concentrated in relatively few hands. (See Table I.) Only 318 individuals subscribed securities of any kind, and even within this small group there was a marked concentration of holdings. (See Table II.) Sixteen persons, that is, 5 per cent of the subscribers, had $455,509, slightly more than 50 per cent of the total amount. These were the individuals who held $10,000 or more. If they are combined with those who subscribed $5,000 and under $10,000, it appears that 45 persons, or 14 per cent of the subscribers, held $644,792, more than 71 per cent of the total amount subscribed.

TABLE I

PRIVATE AND STATE SUBSCRIPTIONS (INCLUDING INTEREST) TO THE FEDERAL LOAN OF 1790

Type of Subscription	*Private*	*State*	*Total*
Loan-office certificates	$172,270	$271,460	$ 443,730
Army certificates	498,526	529,863	1,028,389
Civilian certificates	27,644	9,747	37,391
Miscellaneous certificates	2,954	.....	2,954
Indents	172,521	4,599	177,120
Currency	29,549	2,400	31,949
Total	$903,464	$818,069	$1,721,533

[9] Federal commissioners issued securities after the war in the process of settling accounts of officers previously in the service of the Continental Government. These notes were referred to according to the name of the commissioner who issued them. See the entries for different types of federal debts in *American State Papers, Finance* (Washington, 1832), I, 239.

[10] Continental currency drew neither interest nor indents.

TABLE II

SECURITY HOLDINGS CLASSIFIED BY AMOUNT OF SUBSCRIPTION

Subscription	*Number of Persons*	*Per Cent of Total Persons*	*Combined Holdings*	*Per Cent of Total Subscription*
$1 and under $100	51	16	$ 2,585	.3
$100 and under $500	96	30	26,005	2.9
$500 and under $1,000	48	15	33,305	3.7
$1,000 and under $5,000	78	25	196,777	21.8
$5,000 and under $10,000	29	9	189,283	20.9
$10,000 and over	16	5	455,509	50.4
Total	318	100	$903,464	100.0

The mass of small holdings, on the other hand, had nearly disappeared. The first owners of loan-office certificates, army certificates, etc., seldom held amounts in excess of $500. Allowing for the possibility that one individual may have been the first holder of more than one kind of security, it is safe to conclude that among the thousands of original small owners, the great majority did not have more than $500. This amount, even with accumulated interest, would not have grown to $1,000 by 1790. Yet only 195 persons subscribed amounts of less than $1,000, and their combined holdings of $61,894 were less than 7 per cent of the total. Most of the original small holdings, it appears, were in the state treasury or the hands of larger investors.

A further inquiry confirms the supposition that most of the federal debt was transferred by 1790.[11] Of the $455,509 subscribed by the 16

[11] The following methods were followed in computing the degree of transfer: (1) Whenever a certificate was first issued to anyone bearing the same family name as the holder in 1790, it was counted as an original holding. (2) Indents were considered original holdings if presented by a person who had original holdings of other securities sufficiently large to have drawn the indents. If the person had no original holdings of other securities, his indents were counted as secondary holdings. In a few cases, indents were divided between original and secondary holdings. (3) Subscriptions of currency were arbitrarily classified; those above $100 in real value were considered secondary holdings and those of lesser amount deemed original holdings.

Transfer of loan-office certificates posed a problem. After February 1786 individuals holding many of these certificates, each of small value, were allowed to bring them into the loan offices, if their total holdings aggregated $100 or more in specie value, and receive a single new certificate issued in their own name. This name appears on the certificate subscribed in 1790 as that of the original holder. It has been possible to establish in each case, however, the names of the original holders of the certificates for which the later certificate was exchanged. —Register of Depreciated Continental Loan Office Certificates Cancelled and of Certificates Issued for Their Specie Value by Thomas Harwood, Continental Loan Officer in the State of Maryland, "Old Loans," Record Group 53, National Archives.

largest holders (see Table III), 95 per cent had been acquired by transfer, and we know that the discount on securities ranged from sixty to

TABLE III

TRANSFER OF SECURITIES ACCORDING TO THE SIZE OF SUBSCRIPTION

Subscription	*Total Amount*	*Acquired by Transfer*	
		Amount	*Per Cent*
$1 and under $100	$ 2,585	$ 844	33
$100 and under $500	26,005	17,905	69
$500 and under $1,000	33,305	23,753	71
$1,000 and under $5,000	196,777	132,377	67
$5,000 and under $10,000	189,283	123,155	65
$10,000 and over	455,509	430,533	95
Total	$903,464	$728,567	81

eighty cents on the dollar.[12] Within this group of 16, however, there was a still smaller number of individuals who had amassed such enormous holdings by purchase of transferred securities as to lend credence to the popular belief that the funding program would make "nabobs" of a few.

The firm of Benjamin Stoddert[13] and Uriah Forrest subscribed $96,417, besides which Forrest presented $3,840 on his own account.[14] Together, these two men had 11 per cent of all securities subscribed by private individuals in the state. Not a dollar was originally issued to them or members of their family bearing the same name, unless we allow them $124 in paper money. Another Maryland firm of Charles Wallace and John Muir subscribed $35,677, besides other sums on separate account, which brought their combined holdings to $56,478. Only $266 was an original holding. John Laird held nearly $58,000 in

Even so, the transfer of loan office certificates cannot be established with absolute conclusiveness. In 1780 and 1781 they were used like money by federal agents, who took them out in their own names and signed them over to federal creditors. Therefore, though presented in 1790 by the first assignees, these securities would appear as transferred, though the transfer was in fact merely technical. While this practice undoubtedly existed in Maryland, a general survey of the records does not indicate that it was sufficiently great to invalidate the figures given above regarding the rate of transfer.

12 The discount may have been less on certain loan-office certificates, particularly if transferred before 1782. Up to that time, Congress paid the interest in French bills of exchange on those issued before March 1, 1778. This upheld their value.

13 Stoddert's name is given as Stoddard, but he can be identified as the same man through his mercantile partnership with Uriah Forrest.

14 In computing the figures given in the foregoing tables, joint subscriptions have been considered as having been held in equal parts by the individuals named as having made the subscription.

securities, of which none had been originally issued to him. Gustavus Scott owned nearly $50,000, all purchased. James Williams had $47,550, likewise purchased. Edward Harris had $34,094, of which only $512 was an original holding. Together, these eight men owned $346,182, a little more than 38 per cent of all securities subscribed by private individuals.

Among those who subscribed $10,000 or more, one or two had substantial original holdings. John Weems owned $18,666, arising mainly from loan-office certificates issued to James Weems, which may be regarded as an original holding. Major John Davidson had $11,394, of which perhaps $6,520 can be regarded as an original holding, the result of his tenacity in hanging on to his own army certificates. But Nicholas Slubey, who subscribed $11,623, had no original holdings. William Campbell had $15,802, all purchased. Richard Potts subscribed $12,085, all purchased, except perhaps $8.27 in old currency. Randolph B. Latimer subscribed $16,957, all purchased. Dr. Philip Thomas had $11,887, all purchased except $11.64 in old currency. Adrian Valch subscribed $10,907, all purchased. These names exhaust the list of the lesser subscribers who held more than $10,000, and it may be seen that with two exceptions, their holdings arose from speculative investment. Most of these men can be identified as prominent Marylanders—merchants, politicians, lawyers, military officers, and land speculators, including several members of the governor's council, and delegates to the Continental and United States Congress.[15]

[15] Identifications of most of these men have been kindly supplied by the Hall of Records at Annapolis and the State Historical Society at Baltimore. In the case of names that were very common, some doubt must remain that the following individuals were the same men as those whose names are given in the records. It appears, however, that Benjamin Stoddert and Uriah Forrest were merchants located in Georgetown. Stoddert speculated in lands and assisted President Washington in the purchase of sites in the District of Columbia. Uriah Forrest was at one time or another a member of the governor's council, a major general in the state militia, delegate to the Continental Congress, and representative in the United States Congress. Charles Wallace was a merchant, associated with John Muir and others. Before the Revolution, he contracted to build the State House at Annapolis. In 1784 he became a member of the governor's council. Gustavus Scott studied law in Scotland and England, took part in the state Constitutional Convention of 1776, and in 1784 served as delegate to the Continental Congress. Moving later near Washington, D.C., he received an appointment as one of the commissioners to erect public buildings in the national capital.

Nicholas Slubey was a merchant and landholder in Baltimore County. Major John Davidson was twice a member of the governor's council. Richard Potts, if the name is identified correctly, served as delegate to the Continental Congress, attended the State Convention that ratified the Constitution, later became a United States senator and an associate justice of the Maryland Court of Appeals. Randolph B. Latimer was a member of the governor's council during the Confederation. Nearly all the other names occur in the contemporary records, except John Laird and Adrian Valch, but cannot be positively identified as belonging to the men in question without more research.

Among holdings of less than $10,000, the degree of transfer was less spectacular, though still great. Taking the whole subscription of private individuals in Maryland, great and small, we find that 81 per cent of the securities had been transferred from the original holders.

This figure probably understates the degree of transfer because it does not include securities issued in Maryland but not subscribed in Maryland to the federal loan. Federal treasury estimates make it appear that at least $292,000 of the principal value of loan-office, army, and civilian certificates granted in Maryland were not subscribed in that state. One cannot be certain, but no doubt a good many of these securities found their way into the portfolios of out-of-state speculators, who registered them directly at the federal treasury.[16]

The extent of transfer disclosed in 1790 confirms the impression of a brisk trade in securities during the Confederation, and a closer inspection of the figures indicates something about the course of the trade. (See Tables IV and V.) Army certificates, the largest element

TABLE IV

TRANSFER OF SECURITIES ACCORDING TO TYPE

Type	*Total Amount Subscribed*	*Acquired by Transfer*	
		Amount	*Per Cent*
Loan office	$172,269	$108,985	63.3
Army	498,525	409,547	82.2
Civilian	27,644	16,119	58.3
Miscellaneous	2,953	2,331	78.9
Indents	172,521	163,272	94.6
Currency	29,549	28,309	95.8

of the federal debt in Maryland, were also the favorite object of speculators. The relatively lower rate of transfer among subscriptions of from $1,000 to $10,000 (see Tables III and IV) reveals the existence of a number of army officers who had received several thousand dollars after their discharge and who were presumably wealthy enough to be under no need of selling. They managed to keep their securities, which with accumulated interest often ranged above $5,000 and were frequently augmented by speculative purchases. The great bulk (82 per cent) of the army debt, however, was transferred before 1790. Most of it consisted of the very numerous small notes issued to needy soldiers during years of postwar depression. Notations in the account

[16] It should also be observed that Maryland speculators might have owned securities issued in other states which they subscribed at the federal treasury. The principal value of securities originally issued in Maryland is given in *American State Papers, Finance*, I, 239.

book in the Maryland Archives show that the rights to a great many of these certificates were sold before they were issued. As army certificates were abundant and were frequently offered, they passed at low prices and were the main concern of the really big speculators. Nearly 55 per cent of all army certificates privately subscribed were owned by men whose subscriptions were greater than $10,000. The blocks of army certificates held by these men constituted nearly 28 per cent of all securities subscribed by private individuals and over 98 per cent represented transfers.

TABLE V

TRANSFER OF TYPES OF SECURITIES ACCORDING TO SIZE OF SUBSCRIPTION *

Type	*$1 and under $100*	*$100 and under $500*	*$500 and under $1,000*	*$1,000 and under $5,000*	*$5,000 and under $10,000*	*$10,000 and Over*
Loan office	$1,280	$11,120	$14,435	$59,820	$45,788	$39,824
	(37.3)	(53.7)	(61.1)	(55.7)	(74.9)	(65.5)
Army	279	10,861	13,353	108,817	113,589	251,623
	(70.5)	(86.8)	(83.3)	(68.5)	(58.9)	(98.3)
Civilian	397	1,758	2,179	3,429	10,564	9,315
	(19.9)	(53.0)	(79.2)	(48.8)	(25.1)	(97.2)
Miscellaneous	.....	.....	.....	736	26	2,190
				(85.0)	(100.0)	(76.6)
Indents	110	1,086	2,601	18,673	18,594	131,454
	(80.3)	(56.4)	(59.9)	(91.5)	(100.0)	(95.3)
Currency	516	1,177	735	5,300	718	21,100
	(0.0)	(81.3)	(72.2)	(96.2)	(96.3)	(99.7)

* Under the total subscription in each category is the percentage of the subscription that consisted of transferred securities.

Loan-office certificates, on the other hand, were less subject to transfer, although they had been on the market for the longest time. As we have seen, they were fairly well concentrated from the beginning and were most apt to be held by men who could afford to keep them. Usually, the market price ran above other types of securities, and the great speculators evidently made no special effort to purchase them. Sixty-three per cent of all loan-office certificates subscribed by private individuals had been transferred; however, among subscriptions larger than $10,000, only 65 per cent of the loan-office certificates represented transfers. The greatest holders hardly speculated in them more than the average holder.

The figures on the distribution and concentration of privately held securities in Maryland leave no doubt that the funding operation of 1790 was a speculator's windfall. The surprising thing, however, is the small number of persons (318) who had a direct pecuniary interest in this phase of the Hamiltonian program. It might be argued that economic self-interest, at least in a narrow sense, did not involve any considerable segment of the population. On the other hand, one might stress the implication that the funding operation directly benefited a very small but powerful group. The 123 individuals who held over $1,000 included men of weight and standing who had a stake in the funding measure, and eight of them were great speculators whose interests were critically involved.

It is not possible to say whether the very large holdings were pyramided after 1787 in the expectation that the new Federal Government would fund the debt on favorable terms. Certainly the prospect of federal funding induced a fever of speculative activity. The financial records, however, afford no solid clues in regard to when transfers took place.[17] Moreover, it should be noted that an active speculation went on during the Confederation that had no necessary connection with the movement for constitutional revision. Federal securities were never dead paper, even though Congress did not pay the interest or principal. Except for loan-office certificates, they came on the market after 1782, and the states soon began making some kind of provision for them. In some cases this provision was substantial; in other cases it did not amount to much. Nevertheless, whatever measures the states took in support of federal securities helped to sustain or improve their market value, affording opportunities for profitable speculation. Speculators who gambled in such current possibilities during the Confederation were already in a position to gain from the establishment of a national government.

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[17] Information of a kind is available. Maryland and other states paid the interest on federal securities in indents. The records of these payments in Maryland, which occurred after 1787, give the names of original and present holders of securities. The general picture is much the same as in 1790. Most securities have been transferred. Some of the big holders of 1790 are represented, though others are not. Unfortunately, these records have only a limited usefulness. Only a part of the securities were brought in to receive indents. There is no reason to believe that the securities listed were the full holdings of the large investors. Moreover, the payment of indents took place after 1787, when the movement for constitutional revision promised success. For these reasons no detailed analysis has been made of these accounts. See Register of Certificates of the Liquidated Debts presented at the Continental Loan Office in the State of Maryland and of Interest paid thereon . . . "Old Loans," Record Group 53, National Archives.

Research Notes

"THE EVOLUTION OF THE ENGLISH CORN MARKET"

The purpose of this note is to examine the method by which N. S. B. Gras establishes his thesis concerning the evolution of the English grain markets. According to his book,[1] grain markets evolved through several distinct stages, culminating in the "metropolitan market." Although the influence of the London market by the sixteenth century can be demonstrated without reference to the existence of the early stages, it is nevertheless they that constitute the essential novelty of Mr. Gras's approach and, presumably, the main contribution of the book to the study of economic history. It will be contended below that the existence of certain of these early stages is at least doubtful and that, in any case, their economic significance is either negligible or not provable.

Mr. Gras adduces literary proof (quotations from books, manorial and public records, etc.) that almost from the time of the Conquest there were regular organized movements of corn between manors throughout England. It is primarily these intermanorial movements that characterize the first stage in the evolution of the grain market: the corn changing hands represented either sales by manors having surpluses to manors having shortages or, more commonly (when a number of manors were owned by a single person), movements of grain from "food farms" to the owner's residence. This "stage" lasted from 1100 to about 1250. Yet even during this period local markets were developing in which the manors were beginning to sell their grain for cash.

The subsequent growth of local markets and the superimposition on them of territorial markets or "rural market areas" mark the advent of the second stage, which was instrumental in breaking up the manor and with it the "intermanorial market." The rural market areas were of considerable size, often covering the territory of several counties, and trade was carried on within each area more or less independently of trade outside. Thus London, for example, did not ordinarily influence corn prices outside its own market area, and except for exports abroad corn did not move between the areas, although presumably it moved freely within each area. From approximately 1250 to 1500 the trade in grain was characterized by this "market area" pattern.

The third and final stage in corn-market development was broken into two periods: that of the "municipal market" from 1500 to 1660 and that of the "metropolitan market" that followed. In the former period London—and, implicitly, other city market centers—influenced corn prices over much broader areas than in the time of the territorial markets. In the latter period corn prices and movements throughout England were completely dominated by London, which by this time had added to its own demand the requirements of Continental markets.

[1] *The Evolution of the English Corn Market from the Twelfth to the Eighteenth Century* (Cambridge: Harvard University Press, 1926).

The foregoing brief description does not, of course, do justice to Mr. Gras's exposition, but merely presents the essential features of his schema. Each stage will be examined more closely below.

The existence of the intermanorial markets as a "stage" characterizing the grain trade must be qualified by material presented in the book itself. Evidence that most manors were formed into groups under single proprietors and that intermanorial grain movements did indeed take place regularly appears unimpeachable as far as it goes. However, there are no quantitative or other data which would justify any further inference that *significant* quantities of corn moved between manors (cf. p. 11). Nor, according to Mr. Gras himself, can manorial trade with the developing local markets be regarded as very considerable (p. 24). Thus, from the point of view of absolute quantities of grain involved, and from the point of view of what sort of trade, if any, was characteristic of the economy *as a whole,* there does not seem to be any basis for conceiving the period as a distinct stage in the development of the grain trade. What is interesting about the period 1100–1250 is that it marks the beginnings of a more or less free town market at a time when the manor was still the basic economic unit. Gras did not specifically investigate the influence of this development on the nature and speed of evolution of the market, though it may have been considerable.

The second stage is established on the basis of three main lines of evidence: prices, corn movements, and municipal regulations. Study of price data in Thorold Rogers' *Agriculture and Prices in England*[2] indicated to Mr. Gras "the existence of local market areas, that is, districts having a strong tendency toward a differential price level" (p. 42), and it is here that his method is most open to criticism. The table from page 41 of the book, listing all of the local market areas and the average prices ruling over selected periods, is reproduced as Table I. (On page 47 of the book these areas are represented on a map of England.)

The question now to be asked is whether or not the price differentials between the areas are meaningful; in other words, whether they are sufficient in size to warrant Mr. Gras's inference that the areas do constitute separate markets. It might be noted that in none of the three periods over which prices were averaged was there adequate price representation for *all* sixteen areas: for the period from 1259–1300 only nine of the sixteen had price data for twenty or more of the forty years involved; in the second period only six and, in the third, five of the areas were represented by price data in fifty years or more of the one hundred. Accordingly, Mr. Gras limits much of his analysis to constituent data on a few of those areas best represented in the statistics; namely, Lower Thames, Upper Thames, Cambridge, Battle, and a few others. Table II observes the same limits.

A first approximation to a conclusive answer is given by applying the statistical test known as the "F test" to data presented by Mr. Gras for three short constituent periods. Table II is Mr. Gras's table from page 57 showing price movements in selected areas of a size that he considered "not at all uncommon" (p. 56) in the rural market-area stage.

[2] James Edwin Thorold Rogers, *A History of Agriculture and Prices in England from 1259 to 1793* (Oxford: Clarendon Press, 1866–1902), 7 volumes.

TABLE I

AVERAGE PRICES OF WHEAT, 1259–1500

	1259–1300		1301–1400		1401–1500	
Area	*Number of Years*	*Pence per Quarter*	*Number of Years*	*Pence per Quarter*	*Number of Years*	*Pence per Quarter*
Upper Severn	12	67	74	67	19	53
East Suffolk	20	66	33	67	9	56
Upper Thames	39	60	100	69	86	63
Cambridge	26	62	65	70	89	61
Bristol	29	61	41	66	46	67
Southampton	27	66	66	76	19	63
Norwich	30	70	27	72	26	66
East Kent	24	69	78	73	11	72
Trent	4	58	21	79	25	66
South West	22	68	20	72	34	73
Lower Thames	36	66	95	75	75	77
York	12	64	12	85	23	72
Durham	5	61	11	89	69	74
East Essex	11	69	16	92	8	69
Battle	16	74	45	79	60	76
South Wales	—	—	(23)	(87)	—	—

TABLE II

VARIATION IN YEARLY PRICE AVERAGES
(in pence)

Years	*Upper Thames*	*Lower Thames*	*Cambridge*	*Battle*	*Hampshire*	*East Kent*	*York*	*Trent*	*Bristol*	*Durham*
1345–45	46	46	36	—	75	39	—	—	—	—
1346–47	68	86	71	—	109	89	—	—	—	—
1347–48	81	85	73	—	83	67	—	—	—	—
1348–49	55	53	47	—	47	54	—	—	—	—
F = .64										
1401–02	96	122	120	96	73	—	—	—	97	—
1402–03	79	93	80	64	64	—	—	—	76	137
1403–04	64	60	44	52	48	—	—	—	55	78
F = .76										
1436–37	51	88	69	80	—	—	60	74	69	—
1437–38	85	176	96	120	—	—	158	99	—	—
1438–39	176	240	164	—	—	—	160	132	179	—
F = .50										

Now Mr. Gras contends that such price variation as existed within the area was of less importance than that between areas (pp. 64 and 56). In other words, the price data from each area may be considered as having been drawn from a separate "population" of prices, the mean of which is not identical with the means

of the others. The F test is set up on the opposite or null hypothesis that the price data for all the areas represent random drawings of samples from a single large population of prices, and therefore each of the areas should tend to have the same mean. If Mr. Gras's hypothesis is true, we would expect the dispersion of the means of each area around the grand mean for all the areas to be noticeably greater than the dispersion of the prices *within* each area around the mean for that individual area. On the other hand, if the null hypothesis is true, we would expect the dispersion in both cases to be roughly similar. In the F test, dispersion is measured in terms of the size of the variance (the sum of the squared differences of each observation from its own group mean [cf. Table III, footnote ‡]) of each set of figures, and the variances are then compared in a simple ratio, the numerator of which is the variance of the area means around the grand mean and the denominator of which is the total variance of the prices within each area. Thus on the null hypothesis we would expect F to be equal to or less than one; on Mr. Gras's hypothesis we would expect F to be greater than one. As shown in Table II, the F values in each case turn out to be less than one, and therefore it does not appear that this evidence is sufficient to allow us to reject the null hypothesis that the areas are *not* represented by separate price populations but are samples drawn from the same population and therefore have a common mean; that is, Mr. Gras's hypothesis is not confirmed when the test is applied to the particular data shown.

This test is not taken to be conclusive, however, since the price differentials between the areas, while they may be insignificant in size, may yet be sufficiently persistent to justify the notion that they comprise separate market areas. Accordingly, a more direct approach can be employed; namely, to regroup the original price data into market areas other than those selected by Mr. Gras. If the price differentials between the new areas are comparable in size to those for the areas selected by Mr. Gras, then both sets of groups have equal claim to being designated market areas; two mutually exclusive hypotheses would thus be proved. And if arbitrary groupings which include noncontiguous areas have equally large price differentials, it becomes clear that one must look for some other criterion of a market area, since the mere fact of price differentials of the size found by Mr. Gras does not unequivocally establish the existence of separate areas.

Using the size of variance as a measure of price differentials between market areas, this process of regrouping has been carried out on the data for 1359–1400, and the results are given in Table III. The measurement is again limited to those best represented by price entries, on which Mr. Gras's conclusions rest most heavily: Cambridge, Upper Thames, Lower Thames, and Battle. Now each of these areas is, for purposes of price comparison, the rough equivalent of the following political-geographic areas:

Cambridge area: Cambridgeshire
Upper Thames area: Bucks, Berks, and Oxfordshire
Lower Thames area: Surrey, Herts, and Middlesex
Battle: Sussex

A comparison of the variance of the average prices (1359–1400) for Mr. Gras's particular grouping of these counties with that for the counties ungrouped (which

is essentially an alternative grouping of manorial price entries), as well as that for two completely different groupings, one more or less logical and one arbitrary, is made in Table III.

TABLE III

COMPARISON OF VARIANCE FOR SELECTED COUNTY GROUPS

Gras's Areas	*Average d. per qr.*	*Ungrouped Constituent Counties*	*Average d. per qr.*	*Logically* Regrouped Counties*	*Average d. per qr.*	*Arbitrarily Regrouped Counties*	*Average d. per qr.*
Upper Thames	68	Bucks	77	Oxford	62.5	Bucks	89
Cambridge	79	Berks	52	Cambridge		Essex	
Lower Thames	73	Oxford	62	Berks		Kent	86
Battle	80	Cambridge †	63	Surrey	68	Oxford	
		Surrey	87	Middlesex		Sussex	89
		Herts	76	Bucks	76.5	Warwick	
		Middlesex	65	Herts		Surrey	68
		Sussex	79	Sussex	79	Berks	
						Herts	83
						Suffolk	
Variance σ^2	31.3		131.0		56.9		76.5
σ‡	5.6		11.5		7.6		8.8
V§	7.5%		16.5%		10.6%		10.6%

* Regrouped by contiguous counties but differing from those of Mr. Gras. Oxford and Cambridge are exceptions.

† The considerable discrepancies between Mr. Gras's "Cambridge area" and my Cambridge county arise from the fact that he included bits of other counties in the Cambridge figure. The averages computed for the constituent counties agree quite closely with his market-area averages, so that discrepancies may be attributed to rounding off in my figures.

‡ $\sigma = \sqrt{\Sigma (p_i - \bar{p})^2/(n-1)}$. Where p = prices; $\bar{p}$ = mean of prices; n = number of prices; i = 1 to n.

§ $V = \frac{\sigma}{\bar{p}} \cdot 100$. One naturally expects the coefficient of variation for the "ungrouped constituent counties" to be larger than for Mr. Gras's groups, since a smaller price sample is involved in each county, and this column is included merely to illustrate the way in which his groups were made up. But the other two sets of groups are roughly similar to his and afford a legitimate comparison.

According to these results, the claim to being "separate market areas with a strong tendency to equality of price within each" can be made even more convincingly for the constituent counties or the regrouped counties than for Mr. Gras's market areas, for the variances around the mean of each alternative set of groups are larger than the variance around the mean of Mr. Gras's set of groups. The same conclusion holds if these results are converted into coefficients

of variation, that is, the V values shown, which make the measure independent of units.

Even without the foregoing statistical evidence, however, there are reasons for questioning the existence of the rural market areas:

1. One would expect prices to equalize themselves along rivers and coastlines where cheap transportation allows market arbitrage to operate with greatest effectiveness. Yet Mr. Gras's areas cut the Thames and other rivers in half, isolate opposite shores of the same river, segregate adjacent bits of coastline, and in general show no *economic* pattern whatever. The pattern that is in evidence seems to have been formed more or less arbitrarily by drawing neat circles around contiguous counties on the map. Possibly this was suggested by the fact that Rogers' price data are identified by counties.

2. The price data themselves, as Mr. Gras points out, are subject to considerable incalculable error owing to the variation in grain measures, monetary units, and even definitions of grain from time to time and area to area. In view of the fact that modern statistics are generally considered subject to something like five per cent error of observation, the small price differentials found by Mr. Gras in the very ancient statistics available might in some cases be completely absorbed by error.

3. The price differentials which Mr. Gras found are so small absolutely that they could as easily be explained by transport costs, on the hypothesis, for example, that the whole of England was one market with London as the center.

4. There are apparently no good reasons, other than price differentials, for supposing that the rural market areas were in any sense real markets. Mr. Gras's two other lines of evidence supporting the market-area thesis are concerned with grain movements and with municipal regulations. While he admits that these are weak arguments, they might be mentioned for the sake of completeness: proof that grain moved in important volume (*a*) within the market area and (*b*) *not between* market areas is given negatively. The fact that no internal barriers to corn movements were in force is cited to support the first contention, and no mention is made of possible internal patterns of trade or of the existence of a market center. The fact that grain movements between areas (of which there is considerable evidence) were connected with the export trade supports the second argument, along with the statement (p. 64) that there was surely no movement of corn from the high-priced consuming areas to the low-priced producing areas. The above cannot be regarded as adequate support for Mr. Gras's thesis.

Although the history of municipal regulation shows clearly the position of the town as a more or less monopsonistic buyer vis-à-vis the rural group of competitive producers and sellers, none of this evidence is connected directly with the market areas as such, and up to the period of the "municipal market" the same evidence would support the hypothesis that only town markets existed.

The vacuum left in the evolution of the English corn markets by the excision of the two stages just discussed appears to be quite easily filled by making a direct transition from a village market to a town market (still served by the immediate countryside) to the municipal or metropolitan market. In fact, one is struck by the evidence of the possible price leadership of London (the Lower

Thames area) from as early as 1411. The graph on page 45 of Mr. Gras's book shows this area with consistently higher prices and greater fluctuation than the areas with which it has been compared.

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MEDIEVAL ECONOMIC COMPETITION

Nineteenth-century romanticism and the hardships of capitalist individualism have caused scholars to emphasize collectivistic social and economic institutions in the Middle Ages. Carried to extremes by the English socialists, this attitude tended to ignore or even to deny the competitive aspects of medieval production. Church authorities and guild ordinances were often cited in support of the thesis that the era was noncompetitive. Even Sombart was able to see in the medieval craftsman and tradesman a *petit bourgeois* who typically held to the morals prescribed by church authorities.

The fact is that in the Middle Ages, as in any other period, public institutional utterances represent ideals which have to be recalled to the minds of men because they have not been fulfilled; "the lofty ideals of medieval religion were no more effective in molding political activity and way of life than are our ideals of democracy, equality, toleration, and progress."[1] I believe that medieval competition has generally been underestimated. The evidence that will be presented here admittedly is drawn from a limited portion of Continental medieval Europe. The suggestion is made, however, that competition was stronger at that time than is generally supposed, especially for the area.

The developing credit institutions indicate a propensity to do business on the basis of rationally calculated means and ends rather than on the basis of brotherly love. Contrary to the statements of Sombart, the medieval market was not as undeveloped and not as stationary as we have been led to believe.[2] As Schumpeter has suggested,[3] quality competition, sales effort, form of organization, and especially competition from a new commodity, new technology, and a new source of supply are often much more effective competitive instrumentalities than a price variable. New commodities and in particular new methods of production demand considerable investment and do not necessarily strike at the margin of profit of the existing firms but at their very lives. Applied to the Middle Ages, this

[1] Robert S. Lopez, "Still Another Renaissance," *American Historical Review*, LVII (October 1951), 2. See also Austin P. Evans, "The Problem of Control in Medieval Industry," *Political Science Quarterly*, XXXVI (1921), 601 f.

[2] Werner Sombart, *Der Moderne Kapitalismus* (Munich, 1922), II, chap. 6; Karl Polanyi in *The Great Transformation* (New York: Farrar & Rinehart, 1944), holds that the medieval market and its credit institutions were undeveloped and stationary. In contrast to this, see Bruno Kuske, "Die Entstehung der Kreditwirtschaft," *Die Kreditwirtschaft* (Leipzig, 1927), I, esp. 3 f.; Erich Wege, "Wie Zuenfte als Traeger wirtschaftlicher Kollektivmassnahmen," *Vierteljahrschrift fuer Sozial und Wirtschaftsgeschichte*, Beiheft 20 (1930), esp. 13–25; and Erich Koehler, "Einzelhandel im Mittelalter," *Vierteljahrschrift fuer Sozial und Wirtschaftsgeschichte*, Beiheft 36 (1938), 91 f.

[3] Joseph Schumpeter, *Capitalism, Socialism, and Democracy* (New York: Harper & Bros., 1947), pp. 84, 85.

means that competition might not only take place among members of the same guild but also between members of different guilds, not only between commodities of the same kind but between dissimilar commodities.

The best-known cases of interguild competition are found, of course, in the textile field, technologically one of the most advanced. There was open competition among the fustian, linen, woolen, and sackcloth weavers.[4] Indeed, the separation of these specialists into guiids of their own during the fourteenth and fifteenth centuries did not put an end to the competition that had been going on when the various branches had been organized within one guild. Cotton took the place formerly held by linens and woolens in Frankfurt, Ulm, Cologne, Basle, and other German cities, particularly in the south. The advent and the popularity of cotton cloth were based on a very important fact: cheapness. Many people who had not been able to buy woolens and linens on the market could now afford to purchase cotton fabrics to meet part of their need.[5] The potential consumer market was thus extended. In addition, a variety of mixed fabrics that used cotton in warp or woof made their appearance. Raw cotton was imported by merchants who purchased it in Venice and Bruges. First quality cotton probably was imported from Egypt and Asia.

Toward the last quarter of the fourteenth century and during the fifteenth century the linen and woolen trades in the German cities, as is well known, declined seriously. In good part this was due to the advent of English competition, the progress of the putting-out system of manufacture,[6] and the rise of the cotton industry. Many skilled urban craftsmen migrated as a result of these factors.[7] In some cases, they were absorbed by the silk industry, which offered a more rewarding existence than the declining trades.

Closely connected with the rise of the silk industry in Cologne was the introduction of indigo and the specialists who used it, the silk dyers. Although organized within the linen dyers guild, the silk dyers none the less seem to have been a distinct group, which from the very beginning competed with the woad-

[4] Heinrich von Loesch, *Die Koelner Zunfturkunden* (Bonn, 1907), I, 133, 149, 183, 185 #8; II, 101, 358, 366–67, 373 f., 456, 511. See also Traugott Geering, *Handel und Industrie der Stadt Basel* (Basle, 1886), pp. 257, 259–65, 293, 301–13. See also *Urkundenbuch der Stadt Strassburg,* eds. H. Witte and G. Wolfram (Strasbourg, 1896), V, Pt. II, No. 434, 381; for competition between weavers and other textile workers, see *Urkundenbuch der Stadt Strassburg,* ed. J. Fritz (Strasbourg, 1899), VI, No. 32, 23.

[5] As early as 1309 there was a *factor saroccarum* in Cologne.—Loesch, *Zunfturkunden,* I, xviii. The slow development suggests that there was some difficulty that had to be overcome if cotton were to compete with the other textiles. Both spinning and dyeing seem to have presented difficulties at first.—Morris DeCamp Crawford, *The Heritage of Cotton* (New York, 1924), p. 6; Henri Lecomte, *Le Coton* (Paris, 1900), pp. 280 f. In Strasbourg, cotton weavers and spinners worked for capitalist manufacturers during the fourteenth century.—Robert Levy, *Histoire économique de l'industrie cotonière en Alsace* (Paris, 1912), pp. 1–3. Pure cotton cloth was quite common.—Loesch, *Zunfturkunden,* I, 149; II, 360 f.

[6] Richard Knipping, *Koelner Stadtrechnungen des Mittelalters* (Bonn, 1897), p. lxiv. In Germany, unlike the English development, there was no decentralization of the textile industry due to the fulling mill. The towns usually provided them.—Eliz. Mary Carus-Wilson, "An Industrial Revolution of the 13th Century," *Economic History Review,* XI, No. 1 (1941). But native woolens had not been able to meet foreign competition successfully.

[7] Alfred Doren, *Deutsche Handwerker und Handwerkerbruderschaften im mittelalterlichen Italien* (Berlin, 1903), pp. 85, 93, 123–28.

using linen dyers.[8] For, almost inevitably, silk dyers now and then took in linen while linen dyers took in silk. But the silk dyers used indigo on linen, and this was the crux of the matter. According to the prices paid for indigo by the Germans in Barcelona and Genoa, the initial outlay for indigo was not so much higher than that for woad.[9] Moreover, fewer dippings were needed when indigo was used in the dyeing process, and, last but not least, indigo gave a deep lustrous blue unequaled by woad. Thus indigo dyeing proved to be competitive. The woad dyers tried to cope with indigo by dyeing with gallnut, which yielded a cheaper color. Frequently, too, the woad dyers would try their hand at indigo dyeing without adequate knowledge, often ruining the fabric and producing colors that faded.[10] The indigo dyers, of course, tried to keep their methods secret.

In Cologne as in Erfurt the woad merchants belonged to the patriciate. Small wonder, then, that the city council took vigorous action to protect the woad dyers and to spread anti-indigo propaganda. An effort was made to prove that indigo was not so durable as woad and that it was a "bad" color.[11] Indeed, when German or Dutch masters came to represent the devil in their paintings they used an indigo blue, either to please their patrons or possibly because they had been ordered to do so.[12] While the real importance of indigo does not become apparent for another hundred years, indigo had begun to make inroads by the end of the fourteenth century despite all restraints. This may have explained in part why the woad merchants of Cologne had ceased to exist as a separate guild by the year 1396.

There are many other instances of competition between guilds. In the manufacture of hooks and spangles the needlemakers had to face the persistent rivalry of the beltmakers, and when the interior of houses became more elaborate the cabinetmakers competed with the carpenters in the designing and carving of the banisters of the stairs, the wooden paneling of the walls, and the decoration of the doors.[13] Purse makers as well as beltmakers invaded the preserve of the metal trades when it became the fashion to line purses with metal and to fashion them of metal threads and to decorate belts with copper nails.

The organization of medieval craftsmen into guilds, therefore, did not prevent

[8] The first documented evidence of silk dyers in Cologne is for 1356.—Leonard Ennen-Eckertz, *Quellen zur Geschichte der Stadt Koeln* (Cologne, 1860), I, 157 f.; Hans Koch, *Geschichte des Seidengewerbes in Koeln* (Leipzig, 1907), p. 16. They soon became a special branch of the dyeing industry.—Loesch, *Zunfturkunden,* I, No. 19; Koch, *Geschichte des Seidengewerbes,* p. 27.

[9] Richard Scholz, *Aus der Geschichte des Farbstoffhandels im Mittelalter* (Munich, 1929), p. 108.

[10] *Ibid.,* pp. 104, 110, 112.

[11] Loesch, *Zunfturkunden,* II, 107.

[12] Traugott Geering, "Koelns Kolonialwarenhandel vor vierhundert Jahren," *Mitteilungen aus dem koelner Stadtarchiv,* Heft 11, 54. Fritz Lauterbach, *Der Kampf des Waides mit dem Indigo* (Leipzig, 1905), esp. p. 60.

[13] For the needlemakers, see Loesch, *Zunfturkunden,* II, No. 574, 344. For the cabinetmakers-carpenters controversy, see *Urkundenbuch der Stadt Strassburg,* IV, Pt. II, 204, 206, 213. Judicial decisions from the councils were sought; in Cologne the cabinetmakers lost.—Loesch, *Zunfturkunden,* I, cxx; II, 395, 395–97, pp. 400–401; and in Lübeck the cabinetmakers won.—Carl Wehrmann, *Die aelteren luebeckischen Zunftrollen* (Lübeck, 1864), p. 469.

competition. The factors limiting competition were difficulty of entry (apprenticeship and admittance to mastership), the natural difficulties involved in performing more than one manual process with adequate skill, and, often, vested interest. Monopolistic aspirations undoubtedly contributed to the desire for guild formation, but these aspirations were not always fulfilled. Some newcomers were prevented from becoming competitors—but not all. Monopoly, since it implies exclusion, also had as its other face a heightened competition in almost unfenced zones such as technology. Moreover, where more than one guild engaged in the same field of activity there was relatively free competition, until lines were more sharply drawn and defined during the sixteenth century.

Technological advance frequently resulted in conflict with established practice and organization. In some cases new specialists came to the fore and competed with the old producers in a limited field. For example, with the invention of the wire-drawing machine, driven by water power and requiring some capital for its construction, a new craft arose. The wire drawers began to compete in a field formerly belonging probably to the domain of the armorer or the brazier.[14] In any case, we hear of special wire drawers in Frankfort on the Main in the year 1320, in Nuremberg in 1321, and in Augsburg in 1351. Wire-drawing mills were in operation in Augsburg and Nuremberg in the 1350's, and the city of Frankfort on the Main invested some capital in building a wire-drawing mill in 1355.[15] A development was possibly taking place in some branches of the iron industry similar to that in the textile industry of fourteenth-century England. In any case, complaints of outside interference with the trade of armorers then multiplied.[16]

Ordinarily innovations in technology could be integrated into the guild structure by the separation of one process from an old guild and the appearance of a new guild. Where technology threatened to mechanize the activity of a whole guild, however, its application might be delayed. In 1397 the needlemakers of Cologne forbade the use of machines that pounded eyes into sewing needles and pressed wire into pinheads.[17] It was argued that technological advance threatened to condemn some workers to starvation. This, at least, was the reasoning of the council of Cologne when it denied Walter Kesinger the right to construct a special wheel for combining the twisting with the spinning of silk yarn.[18] De-

[14] The machine was invented in 1305 or 1306.—Otto Doehner, "Die Entwicklung der Drahtherstellung," *Beitraege zur Geschichte der Technik und Industrie,* XIV (1924), 196–97; Otto Doehner, *Geschichte der Eisendrahtindustrie* (Berlin, 1925), pp. 25–6. The wire drawers to which we are referring drew flat metal pieces into wire of about ½ cm. in diameter. Thinner wire continued to be drawn by hand.

[15] Friedrich M. Feldhaus, *Die Technik der Antike und des Mittelalters* (Potsdam, 1931), p. 315. Doehner, *Eisendrahtindustrie,* p. 35.

[16] For the English development, see Carus-Wilson, "An Industrial Revolution," *Economic History Review,* XI, 50, 55, 58. There seems to have been a spread of wire-drawing mills in the countryside.—Doehner, *Eisendrahtindustrie,* p. 38. For documentary evidence of complaints, see Loesch, *Zunfturkunden,* II, 283, 285–86.

[17] Leonhard Ennen, *Quellen zur Geschichte der Stadt Koeln* (Cologne, 1879), VI, 541. See also Feldhaus, *Technik,* p. 338.

[18] Loesch, *Zunfturkunden,* II, 419; Koch, *Geschichte des Seidengewerbes,* p. 35.

spite the express prohibition, however, the wheel was constructed and used. Twenty years later the inroads made by this machine were felt to such an extent that women silk spinners found it necessary to organize into a guild. Many of the male silk spinners, however, remained outside the guild, as did the competing nuns and Beguines.[19]

Some craftsmen of obsolescent industries maintained themselves by entering new fields. Thus the spear makers of Lübeck eked out a living by centering their efforts on the production of wooden pails, tubs, and troughs.[20]

But the guild of the parchment-makers disappeared slowly with the introduction of paper; the spear makers declined when the gun appeared;[21] and the improvement of glass drove out the wooden-cupmakers guild.[22]

The traditional point of view maintains that competition exists in an industry when many independent producers sell a commodity in a market. This is precisely the condition that existed in the textile industry. Here the guildsman had to face the strongest competition from nonguild practitioners who had found a haven in monasteries, convents, and Beguine houses. There was hardly any restriction on the number of looms, on the quality of the product, or the number of workers in such institutions. Frequently the spinners and weavers employed were not clerics at all but laymen hired for wages.[23] This sort of competition was reinforced, furthermore, by the advent of the capitalist manufacturer. To be sure, the guilds made efforts to channelize competition and to keep it at a certain level. Despite the minute detail of attempted regulation, however, these efforts were not too effective.

A common conception regarding the Middle Ages is that the producer was not subject to the effects of competition in the purchase of his inputs. And, indeed, there were laws framed to limit the competitive hiring of journeymen and apprentices. But infractions of these provisions seem to have been fairly common.[24]

Quality standards were enforced mostly on export goods or on foodstuffs. Where there were instances of common purchases of raw materials, the distribution of these materials to the individual craftsman depended on the payment

[19] Koch, *Geschichte des Seidengewerbes,* pp. 35–37.

[20] Loesch, *Zunfturkunden,* I, xlv. The shield makers, who were in the same guild as the painters, became painters when shields became outmoded.—*Ibid.,* I, 137; Benno Schmidt und Karl Buecher, eds., *Frankfurter Zunfturkunden* (Frankfort on the Main, 1914), I, 423 f.; Schulte, *Urkundenbuch der Stadt Strassburg,* V, Pt. II, No. 1261, 916.

[21] The last time the spear makers are mentioned in Cologne is 1345.—Loesch, *Zunfturkunden,* II, 279. In Strasbourg they seem to have maintained themselves until the last quarter of the fourteenth century.—Aloys Schulte, ed., *Urkundenbuch der Stadt Strassburg* (Strasbourg, 1895), IV, Pt. II, No. 10, 213.

[22] Sometime during the fourteenth century; they are mentioned in Strasbourg for the last time during the middle of the fourteenth century.—*Urkundenbuch der Stadt Strassburg,* IV, Pt. II, No. 12, 215. Perhaps they later joined with the coopers.

[23] Ludwig Korth, "Verhandlungen ueber die Hausweberei im Kloster der Tertiarer zu Koeln," *Annalen des historischen Vereins fuer den Niederrhein,* Heft 56, 180–88. Loesch, *Zunfturkunden,* II, 323–25, 327, 465–70.

[24] No craft guild restricted the number of its journeymen or apprentices voluntarily in Cologne until the revolution of 1396; see also Ernst H. Kelter, "Wirtschaftsgesinnung des mittelalterlichen Zuenftlers," *Schmollers Jahrbuch,* LVI (1932), 756; Loesch, *Zunfturkunden,* I, 41, 45; *Urkundenbuch der Stadt Strassburg,* V, Pt. I, No. 571, 476; *Frankfurter Zunfturkunden,* I, 226, 227–28; II, 228.

of hard cash.[25] In certain trades it was possible to circumvent a number of these laws legally upon application and payments for enlargement of the workshop.[26] The fines, which were the most common characteristic of the laws designed to regulate competition, were low enough to be paid easily by the richer craftsmen and hurt only those who did not have sufficient funds.[27]

During the fourteenth century the putting-out system and the credit consortium made great advances and threatened the existence of small firms.[28] In fact, the competitive situation in which the medieval craftsman found himself was further complicated by foreign competition. Until the end of the fourteenth century foreign craftsmen in other than the textile trades seem to have been active competitors. Even when they settled in a city they frequently were able to ply their trade without actually belonging to the guilds.[29] Foreign goods competed on the home market although an effort was made to apply the same quality standards to them as to local products.[30] Membership in the guild did not as-

[25] Loesch, *Zunfturkunden,* I, 46; II, 337; Walter Stein, *Akten zur Geschichte der Verfassung und Verwaltung der Stadt Koeln* (Bonn, 1895), II, 614; Kuske, "Entstehung," *Die Kreditwirtschaft,* I, 28. During the twelfth century the turners guild of Cologne tried to cope with the borrowing of raw material by its members.—Loesch, *Zunfturkunden,* I, 34. Small amounts were apparently lent by the guild, but eventual payment was insisted upon. See also Benno Schmidt, *Frankfurter Amtsurkunden* (Frankfurt on the Main, 1915), pp. 349, 357; Emil Fromm, "Frankfurts Textilgewerbe im Mittelalter," *Archiv fuer frankfurter Geschichte und Kunst,* 3d Folge, VI (1899), 56; *Frankfurter Zunfturkunden,* I, 230, 266; Hermann Heimpel, "Das Gewerbe der Stadt Regensburg im Mittelalter," *Vierteljahrschrift fuer Sozial und Wirtschaftsgeschichte,* Beiheft 9 (1926), 216; E. Wege, "Die Zuenfte als Traeger," *Vierteljahrschrift fuer Sozial . . . ,* Beiheft 36 (1938), 13–16, 25–26.

[26] In Cologne each weaver had only to pay an additional fee for each new loom.—Loesch, *Zunfturkunden,* I, 133. The smiths of Nuremberg had to pay an additional fee for each additional helper.—Joseph von Baader, *Nuernberger Polizeiordnungen* (Stuttgart, 1861), p. 160. And, of course, many workshops were enlarged illegally.—Eric Koehler, "Einzelhandel," *Vierteljahrschrift fuer Sozial . . . ,* Beiheft 36 (1938), p. 32.

[27] The richer guildsmen seem, moreover, to have been able to evade the payment of fines.—Loesch, *Zunfturkunden,* I, xcix, cxxxiii, 120, 144.

[28] Such credits were extended on the production of articles for mass consumption such as were produced by the smiths and other metal trades.—Baader, *Polizeiordnungen,* p. 160; Kuske, "Entstehung," *Die Kreditwirtschafte,* pp. 31 f. The fishing industry of Cologne was organized along these lines by the fourteenth century.—Loesch, *Zunfturkunden,* II, 533, 534. See also Franz Bastian, "Das wahre Geschicht des vorkapitalistischen Kaufmanns," *Vierteljahrschrift fuer Sozial und Wirtschaftsgeschichte,* Beiheft 24 (1931). Famous instances of regular factories were the copper and smelting works of Th. Venrath and the copper rolling mill of Jan Struys, both of Cologne.—Loesch, *Zunfturkunden,* II, 304, 305, 306–7, 571 f. On the credit practices of the dry-goods merchants see Koehler, "Einzelhandel," *Vierteljahrschrift fuer Sozial . . . ,* Beiheft 36 (1938), pp. 91 f.

[29] In 1355 the masons and carpenters demanded the exclusion of foreign masters, but the council of Cologne prevented such "discrimination."—Loesch, *Zunfturkunden,* I, 177. In 1397, however, the masons and carpenters at the height of the reform movement succeeded in obtaining such exclusion.—Loesch, *Zunfturkunden,* II, 436. For estimates on how many craftsmen were outside the guilds in Frankfort on the Main, see Karl Buecher, *Die Bevoelkerung der Stadt Frankfurt am Main in 14ten und 15ten Jahrhundert* (Tübingen, 1886), *passim.* For further information on the conditions in the textile field, see Fridolin Furger, "Zum Verlagssystem als Organisationsform des Fruehkapitalismus im Textilgewerbe," *Vierteljahrschrift fuer Sozial und Wirtschaftsgeschichte,* Beiheft 11 (1927).

[30] In Cologne there was no ban on the sale of foreign wares of good quality until 1435, with the exception of copper and tin wares on the plea of possible injury to public health.—

sure the individual craftsman a noncompetitive local market. The citizens of Cologne, for example, could, if they wished, order wares outside the city; the seller of foreign goods or substandard goods might incur punishment but not the buyer.

A search of the evidence does not confirm the romantic conception of medieval production. It was neither stable nor static. Elsas has shown that wages were not static; Hamilton disputes the stability of prices. The medieval producer and tradesman, like the modern businessman, had cause for anxiety. Some of our concepts regarding the sheltered, benevolent atmosphere of the medieval business community will have to be revised.

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Loesch, *Zunfturkunden,* I, 21. The woolen weavers, with the exception of the year 1230, never attained the right to inspect foreign cloth for its quality.—Loesch, *Zunfturkunden,* II, 478; Gustav Schmoller, *Die Strassburger Tucher und Weberzunft* (Strasbourg, 1879), No. 50, pp. 104–5. After the second half of the fourteenth century many guilds were able to force on the importers inspection of foreign products for quality; this was probably done largely to prevent mixing of these goods with home products, thus altering the quality of the latter, and to prevent resale of foreign goods as wares of Cologne.—Loesch, *Zunfturkunden,* I, 93; II, 355, 576; see also *ibid.,* I, 116, 169, 175; II, 255, 289, 423; see also Koehler, "Einzelhandel," *Vierteljahrschrift fuer Sozial* . . . , Beiheft 36 (1938), pp. 48 f.

Reviews of Books

PATTERNS OF ECONOMIC GROWTH

The Progress of Underdeveloped Areas. Edited by Bert F. Hoselitz. Chicago: The University of Chicago Press, 1952. Pp. x, 297. $4.75.

The currency of programs such as those arising from Point Four has stirred various social science disciplines to unwonted interest in the problems, intellectual and practical, of economic development. In each specialty there has been noted an embarrassing inadequacy of prevalent concepts and procedures to yield satisfactory understanding of the process, much less to supply positive guidance to those who have decisions to make and operations to carry out with respect to underdeveloped areas. Since the problems seem to transcend the resources of the special sciences separately, interdisciplinary efforts are being made. The volume under review reports a symposium held under the auspices of the twenty-seventh Harris Institute on International Relations, which had the modest purpose of promoting communication between specialists, economic historians, anthropologists, sociologists, social psychologists, economists, and administrators. The prepared papers are assembled in three parts, respectively labeled "The Historical Approach to Economic Growth," "The Cultural Aspects of Economic Growth," and "Problems of Economic Policy." The report is moderately encouraging in regard to the possibility of co-operative inquiry. It will be less gratifying to any who believe that detailed goals for economic change can be formulated and pursued with reasonable assurance that the outcome can be controlled.

There is an unexpectedly wide consensus that the prospects for economic growth in any area are to be sought, at least in part, "in the cultural and social conditions of a given population and not in their economy" (p. vi). This proposition is developed variously by the contributors. The formulation of Ralph Linton, an eminent anthropologist, seems to cover a wide range of situations and considerations. All societies and most individuals in them, he holds, would like to improve their economic position, if they had not been frustrated by past experience (such as exploitation by foreign or native rulers). Moreover, the members of all societies are capable of learning to operate mechanisms and to carry out other procedures leading to this improvement. Actually exploitative manipulation of economic change has been usual. Hence Mr. Linton premises three sorts of people in a society with respect to economic change: "innovators, persons who for some reason espouse a new idea and devote themselves energetically to 'selling' it to their society" (p. 75); individuals, frequently misfits, who find innovations congenial; and nearly everybody else, who are justifiably suspicious of change. Mr. Linton holds that the factors tending to inhibit economic innovation can be stated most adequately in cultural terms: (1) patterns of unrestricted breeding, (2) values unfavorable to individual industry and individual accumulation of wealth, (3) varying patterns of ownership of resources, individual and communal, (4) the extent and nature of kinship claims, (5) invidious class attitudes to trade

and to manual work, and (6) a high degree of cultural integration. Mr. Linton apparently thinks that economic change can take place, in spite of these obstacles, bringing social disruption and consequent change in culture as well as changes in the composition of dominant elites.

There is general agreement with Mr. Linton that something can be done which will initiate, hasten, or modify economic change. But there is considerable variance between the specialists in their views about just what is likely to happen, just what such a change may be like. Participants in the symposium were apparently not committed in advance to a definition of "progress," "change," or "development," or to any specification of the "underdeveloped areas." Hence a wide range of subject matter is under review in the several papers. There are the adjustments of relatively isolated tribes to technical change, the past experience of industrialized societies, the possibilities for complex societies now in some phase of incipient industrialization, and there is the conflict between capitalism and communism for areas not dominated by either system. A good many of the participants recognize that there is a certain relativism inherent in the concept of "underdeveloped areas." Nearly all make the point that concretely each case must be expected to present individual peculiarities. But one suspects that there are also categorical differences between the situations discussed. There is no attempt to classify the situations in such terms as population, resources, technological level, or socio-cultural complexity. Hence the whole body of papers leaves something of a blur regarding just what economic development is, when, how, and for whom.

Indeed it is only the policy people who explicitly ask what economic growth means (Jacob Viner, Konrad Bekker, Samuel Hayes, Jr.). Their somewhat discrepant answers tend to include the notion of goals for action. Mr. Viner in a thoughtful discussion of "America's Aims," specifies "an absolute decrease in the numbers of those living at less than some minimum of income" (p. 187) as an indispensable aim of any "fully satisfactory program of economic development." It is not at all evident that this is an indispensable part of the economic growth talked about by other participants.

Many papers seem to envisage nothing more complicated than the transfer of technical skills. There is general agreement that this can be done, with a suitable amount of tact, and that cultural obstacles are not an absolute barrier. But we are warned by other participants that the consequences of even such action are not certain. "We" (the actors in effecting change) may not like them, says Alexander Gerschenkron. Melville Herskovits and Konrad Bekker emphatically concur. All three (an economic historian, an anthropologist, and an economist) declare that one aspect of this unpredictability is that something more is required for economic development than a transfer of skills to an underdeveloped area. If the latter is to grow, it must develop its own patterns and combinations, perhaps even "invent" the ways of growing appropriate for its own situation.

In some other respects, sharper disagreement occurs concerning the nature of the change envisaged. Several papers seem to premise an evolutionary sequence of technological change and gradual social adjustment. In the main, anthropological emphasis upon respect for "native values" is to be interpreted in this

direction. It seems to be basic to the thinking of a good many persons concerned with agricultural and educational aspects of technical assistance programs. For Mr. Gerschenkron, however, looking at the industrialization of European countries in the nineteenth century, economic growth is much more a matter of large leaps. It is a big change on a big scale that succeeds. To develop your country you must adapt the most fully elaborated technology available. Easterbrook's comments on Canada support this view, as does Marion Levy's more abstract analysis. In practical terms, the question is, "Will small changes promote or obstruct large ones?" In other literature of the field, the reviewer has found illustrations tending to support either view, and the divergence does not seem attributable simply to matters of scale.

There is consensus that economic growth has implications going beyond the field of economic behavior. Several participants (notably Gerschenkron, Linton, and Marion Levy, a sociologist) see these implications as revolutionary. The term "subversive" is freely used, with reference to some prior order of things in given societies. Indirectly, the well-indexed references to vested interest groups and elites involve a similar view. But where Levy seems to treat subversion as total and to see industrialization as tending to involve all aspects of a given society, Messrs. Gerschenkron, Opler, and Goldschmidt explicitly regard the impact of economic change on society and culture as highly selective.

It is noteworthy that relatively little emerges from this symposium on the pushes and pulls for economic development. Mr. Linton speaks of "innovators" but thinks his cultural analysis is only negatively related to them. There is an occasional, hesitant reference to a possible scarcity of entrepreneurs. Mr. Easterbrook's thesis that a good deal of government action is normal rather than otherwise seems to be generally accepted, at least as a guide to expectations. The nearest thing to a theory of economic growth comes out of Mr. Gerschenkron's very thoughtful paper, "Economic Backwardness in Historical Perspective." It does violence to the subtlety and modesty of the analysis to term it a "tension theory." But he holds that the onset of industrialization is characterized by "tension between the actual state of economic activities in the country and the existing obstacles to economic development, on the one hand, and the great promise inherent in such a development, on the other" (pp. 5–6). Mr. Gerschenkron analyzes the course of development in terms of a dialectical interplay between the basic peculiarities of backwardness, specially adapted institutional instruments of change, and specific industrialization ideologies. Resolution of tension is not automatic. It may be "delayed," and if so both obstacles and advantages will build up, with catastrophic and uncontrollable consequences. There are interesting possibilities in this theorem, if its implications can be more carefully and clearly worked out. Meanwhile, economic historians, at least, will profit from considering the relevance of Mr. Gerschenkron's "perspectives" to their own inquiries.

LELAND H. JENKS, *Wellesley College*

Bibliography on Income and Wealth, Volume II: 1948–1949. Edited by Phyllis Deane. (Publication of the International Association for Research in Wealth and Income.) Cambridge, England: Bowes and Bowes, 1953. Pp. 109. 37*s.* 6*d.*

Shares of Upper Income Groups in Income and Savings. By Simon Kuznets, assisted by Elizabeth Jenks. New York: National Bureau of Economic Research, 1953. Pp. xli, 725. $9.00.

Studies in Income and Wealth, Volume XV. (Conference on Research in Income and Wealth Series.) New York: National Bureau of Economic Research, 1952. Pp. x, 227. $3.50.

Income and Wealth of the United States: Trends and Structure. (Publication of the International Association for Research in Income and Wealth: Income and Wealth Series, Volume II.) By Simon Kuznets and Raymond Goldsmith. Cambridge, England: Bowes and Bowes, 1952. Pp. 328. 37*s.*

These four books offer convincing evidence on at least two points. First, they attest to the scope and vigor of the quantitative and theoretical work still being done in the field. Second, they clearly reveal how much this important branch of political arithmetic owes to the many-sided activities of one man—Simon Kuznets, a leading spirit of the National Bureau's Conference on Research in Income and Wealth, of the International Association for Research in Wealth and Income, and of the Social Science Research Council's Committee on Economic Growth.

The International Association's second annotated *Bibliography* contains 814 items (a few are duplicates). This total, referring to the two years 1948–1949, is more than half the number included in the first volume, which covered the decade 1937–1947 (see review in this JOURNAL, XIII (Spring 1953), 240–41). The two volumes differ slightly in organization.

Like its predecessor, the second *Bibliography* will prove a most useful guide to specialists and nonspecialists. Also like its predecessor, it has some minor flaws. Among these are: spotty coverage of the literature on production, productivity, and some other peripheral subjects in the "Economic Analysis" section, inconsistency in the use of numerals in periodical citations, only occasional mention of prices of publications, omission of the January 1949 *Economic Report of the President* although a commentary on it (Item 725) and its January 1948 predecessor (Item 727) are listed, repetition of a 1947 entry (Item 129) appearing in the first *Bibliography,* and the misspelling of an author's name (Item 183).

Kuznets' *Shares of Upper Income Groups,* the fruit of many years of labor, really comprises two volumes in one. The first six chapters, covering about one third of the total number of pages, are mainly descriptive and analytical. The rest of the book is essentially an organized mass of statistical work sheets and technical notes.

Kuznets' outstanding conclusion is that the relative income shares of the top percentiles of the population remained virtually stable during the two interwar decades and then declined sharply after 1939. He relates this unprecedented decline to the reduction of unemployment, the rapid growth of farm income, an increasing preference for "service" income over "property" income, the fall in interest rates, and the steep rise in income taxes. "But conjectures alone are possible, and the discussion in the report is limited to a statement of the facts" (p. xxxviii). Kuznets also suggests that the upper income groups' share in total savings declined appreciably after 1939 and that their shares in total income and total savings fluctuate contracyclically. He points to the need for a supplementary detailed study of the lower end of the income spectrum.

Nonspecialists will find *Shares of Upper Income Groups* a difficult book to read and digest. Indeed, garbled versions of its findings have already appeared in newspaper reports and editorials. The general student may find it sufficient for his purposes to read the 15-page Introduction and Summary; but he ought also to glance at the first six chapters, Table 47 on savings (pp. 176–77), and Tables 116–26 on income shares of the various percentiles (pp. 581–697). He will also find helpful the summary that appeared earlier (1950), the National Bureau's *Occasional Paper 35,* and the thumbnail sketch presented in the fourth volume under review, *Income and Wealth of the United States* (pp. 141–45).

Volume XV of *Studies in Income and Wealth* contains the papers presented at the June 1950 meeting of the Conference on Research in Income and Wealth, which was devoted to income-size distribution. Papers on this general topic also appear in Volume XIII and some earlier books of the same series. The seven technical papers deal with: the comparison of incomes of families differing in composition (M. Friedman); the causes and measurement of income inequality (G. Garvy); regional and other factors influencing family and individual incomes (D. G. Johnson); the size and allocation of income in relation to age of family head (J. A. Fisher); the relation of family savings to income level and distribution (D. S. Brady); the influence of the income concept on income-expenditure patterns derived for farm families (M. G. Reid); and equivalent farm and city levels of living (M. Orshansky). A closing paper, by Kuznets, proposes four lines of further inquiry into the size distribution of income: historical changes and area differences, causal factors, the explanation of the relation observed between income size and use, and normative valuation criteria.

Income and Wealth of the United States, the first installment of a world-wide study initiated by the National Association in 1950, is a distinctive addition to the literature of American economic history. Besides an Introduction to the volume as a whole, Kuznets contributes a lengthy essay on our economic development written around trends in income and other measures since 1869. Goldsmith's essay considers the growth of reproducible wealth since 1805. Both authors pay considerable attention to the concepts and limitations of the statistics they employ.

Kuznets' essay ranges more widely than its title (restricted to national income) may imply. It is actually a statistical panorama, showing the changes in size, rate of growth, structure, and performance (in terms of output per capita and per man-hour) of the American economy since the Civil War reconstruction period.

New insights are provided by new juxtapositions of data. Numerous conclusions, hypotheses, conjectures, and questions requiring further investigation are presented. Among the features of special interest are: a critique of national income and related statistics for the years prior to 1870 (pp. 220–41), the valuation of leisure and its inclusion with the flow of consumers' goods (pp. 63–69), a new rationalization of productivity measurement with respect to labor input only (pp. 74–76), and a recomputation of the population and labor force for 1870–1940 to exclude the effect of immigration (pp. 199–201).

A critical reader will frequently find himself in disagreement with Kuznets. One who prefers the Department of Commerce conventions of national income accounting would object to the downward adjustment of national product for the secular growth of government, transportation, and distribution costs, the downward adjustment of the prices of war goods, and the exclusion of nondurable wartime output. Some students will not agree with the argument offered for the exclusive use of labor input in productivity measures (mentioned above), the assertion that war inhibits economic growth, the assertion that war technology has only a "dubious transference value" (p. 217) to the civilian economy, and the view that 1929 price weights make more sense than 1869 weights (pp. 46–47) rather than that both are arbitrary—and admissible. A conceptually incorrect technique is used to separate intraindustry shifts from interindustry shifts in an index of net output per worker (pp. 124–26). Two conventional (though often innocuous) misstatements involving index numbers are repeated. Actually, a "negative correlation" in the usual (Pearsonian) sense between price and quantity relatives does *not* guarantee that an output measure with weights for an early period will exceed a measure with more recent weights (pp. 45–46). Futhermore, the deflation of a value index by any price index translated to the base 1929=100 need *not* yield a quantity index with 1929 weights (p. 44).

Goldsmith's essay, which traces "economic growth from the stock (rather than the flow) aspect," accepts "deflated reproducible tangible wealth per head" as the "best single measure" (p. 247). His wealth concept excludes various types of assets—subsoil, military tangible, and civilian semidurable and perishable. The measure of such wealth per capita, weak in many stated and unstated respects, shows an average rate of growth of 2 per cent per year for the period 1805–1950. This rate, which may be an understatement, is apparently higher than the average rate of labor productivity increase during the same interval. The highest wealth per capita rate for any decade, 3.8 per cent, was achieved in the 1880's. A unique decline occurred in 1930–1945—a period afflicted by depression and war. Since the end of the Second World War, a peak growth rate of 4 per cent per year has been recorded.

Though not so rich in overtones as Kuznets' contribution, Goldsmith's, too, is instructive and suggestive. Several of his calculations have particular interest: series on nonagricultural reproducible tangible wealth per capita, expressed in labor units rather than alleged 1929 dollars (pp. 289–96); ratios of real civilian reproducible tangible wealth (and of a major wealth component, "structures and producers' equipment") to real net national product (pp. 296–300); and series (extending those presented in *Studies in Income and Wealth,* XIV, 18–19) on reproducible tangible wealth, by type for 1805–1948 (pp. 306–9). Goldsmith

is less positive than Kuznets about the comparative rates of productivity growth in the capital goods and consumer goods industries (pp. 160, 291, 303). He agrees with Kuznets that the available figures for the early 1800's understate the probable productivity gain (pp. 288–89). His justification for omitting the value of humans and intangibles (pp. 249–50) need not be inconsistent with Kuznets' position, but there is something more satisfying in the latter's insistence that income and wealth measures are not sufficient for the long-term study of growth; that they must be supplemented by a consideration of the importation and cumulation of knowledge and the immigration of "living carriers" of other civilizations (pp. 219–20). Like Kuznets, Goldsmith also accepts various questionable index number conventions. Witness his assumption that the deflated wealth figures represent estimates in 1929 dollars; and his remark that selection of the 1929 base avoided the "bias which would have been introduced by using a year near one end of the period" (p. 262).

Students of economic historiography will find Kuznets' brief Introduction to *Income and Wealth of the United States* well worth reading. His remarks seem to provide the background not only for this book but also for the new full-time project he is reportedly undertaking on the "course and causes of the economic growth of nations" (*American Economic Review,* May 1953, p. 591). Recognizing the revival of interest in economic growth and recalling the failure of the old "philosophies of history," he asks what contribution the quantitative approach may now make. He takes the sober position that the statistical study of aggregates is still "in its infancy" (p. 14), that figures record the results of growth but not the subtleties of the process. On the other hand, he prefers the statistical approach to verbal generalizations, for it yields results that are subject to test, acceptance or rejection, cumulation, and manipulation.

It is to be hoped that Kuznets will have occasion to write again and at greater length on the important subject of historical method. He evidently has some misgivings about Colin Clark's popular statistical historicism (see *Income and Wealth of the United States,* p. 130). His systematic comments, at this stage of his rich career, on Clark's and Hoffmann's work and on the positions of Hayek, Popper, Eucken, and others would be of great benefit to students of economic history.

Irving H. Siegel, *The Twentieth Century Fund, Washington, D.C.*

AGRICULTURE

The Story of Agricultural Economics in the United States, 1840–1932: Men, Services, Ideas. By Henry C. and Anne Dewees Taylor. Ames, Iowa: The Iowa State College Press, 1952. Pp. xxvi, 1121. $10.00.

This collection of representative selections from personal correspondence, interviews, reports of societies and governmental agencies, memoirs, research bulletins, monographs (published and in manuscript), articles in professional journals, manuals, and syllabuses provides a source book for the origins and growth of agricultural economics to the recovery program of the 1930's. Con-

necting narrative and explanatory annotations afford a fair degree of unity and continuity. Henry C. Taylor's experience as pioneer teacher, writer, and administrator gave him the understanding and inclination for a task extending over a dozen years. He has had effective assistance. The Farm Foundation sponsored the project and the Department of Agriculture and the Library of Congress furnished expert advice and research materials and facilities. In addition to the co-authorship of Anne Dewees Taylor, the late Everett Edwards wrote an appreciative Introduction, Norman J. Wall compiled the extended section on farm finance, and Adelaide Hasse facilitated availability for reference by a 99-page analytical Index.

The first four parts trace the emergence and formulation of theory and methodology; the remainder records the applications in the main areas: marketing, land economics, farm labor, and farm finance. Specialists will differ on the relative adequacy with which the different branches are treated, but, in any case, there would seem to be a serious omission of the influence of mechanization on all the other factors in production and distribution. Another limitation is in the lack of a systematic account of the attitudes and policies of farmers' organization during the present century.

In general the narrative ends at 1933 though later writings on developments to that time are in some cases cited, but this is not done consistently. There are also omissions of pertinent earlier materials.

In the development of basic theory, in this as in other realms of the national economy, attention should be given, it would seem, to the ideas of the native school of Henry C. Carey. The *Festschriften* of students of Carver, Clark, Gay, and Mitchell have themes of direct concern for agriculture. One misses reference to the studies of Alvin Johnson on rent, the single tax, and the trend of land values and no less the critically searching analyses of Joseph S. Davis. John Ise's answer to the question, "What Is Rural Economics," in 1920 in the *Quarterly Journal of Economics,* indicated distinctly the cleavage of emphasis and leadership within the discipline.

In environmental studies the findings of pioneer investigators like Malan, Odum, Vance, and Webb are not noted. In the historical approach the trail blazing of Trimble, Gras and his associates, Craven, Carrier, E. M. Coulter, and Woodward, among others, goes unrecognized. The land studies of Sato, Treat, Wellington, Stephenson, Gates, and Shannon are notable omissions. Typical of neglected contributions in special fields of production and marketing are those of Jacobstein, Robert, and Tilley for tobacco; of Clemen, Osgood, Pelzer, and Wentworth for livestock; and of Wiest for the butter industry.

Henry Colman's observations in New England and Europe and S. T. K. Prime's report on "model farms" in the Middle West should be included among pioneer surveys. Prime should also be given credit for his persistent, if premature, efforts at crop reporting.

Along with the appropriately recognized agricultural writings of Donald G. Mitchell should go the essays of Jesse Buel and of A. J. Downing and the Yale lectures of Henry S. Olcott, as well as the practical manuals of Richard L. Allen and William Crozier and Peter Henderson. Horace Greeley's much

ridiculed book on his knowledge of farming undoubtedly reflected the better prevailing practices.

These suggested addenda of subjects and writings but indicate the expansiveness and involvements, in its varied reaches, of a field of research for which the present work provides such a store of readily available information.

EARLE D. ROSS, *Iowa State College*

The Influence of England on the French Agronomes, 1750–1789. By Andre J. Bourde. (Cambridge Studies in Economic History.) Cambridge: The University Press, 1953. Pp. xi, 250. $6.00.

This volume is concerned with a trivial aspect of an important subject. While the French agricultural reform movement of the late eighteenth century is an important and untrammeled topic in its own right, few things could be more obvious and less worth exploring than the influence of English thought, in any field, during the late eighteenth century upon contemporary French intellectual activity in the same line. That the influence was great goes without saying. Andre J. Bourde tries to make capital of the fact that Duhamel du Monceau translated and annotated Jethro Tull, that the Duc de La Rochefoucauld-Liancourt visited English farms, that English agriculturists (Arthur Young included) visited him, that many English, including some farmers, settled in France, and that English farming books were in wide demand. What Mr. Bourde forgets is that cosmopolitanism in eighteenth-century intellectuals is so taken for granted that the only point of interest that could be developed concerning the relations of French to English agricultural technology during the period would be that the French remained insular and moved along their own lines, without reference to the English "agricultural revolution."

Fortunately, this work is more than a history of international intellectual relations; it is also a study of the agronomic movement in France during the last forty-odd years of the *ancien régime*. Unfortunately, the line of attack chosen by Mr. Bourde leads him to negative conclusions and to a partial misunderstanding of the meaning of the late eighteenth-century French agricultural reform movement. He concludes that "the insistence of the agronomes on English methods is less a fact of economic history than a fact of the history of ideas" (p. 218). The success of the agronomic movement he assesses as limited in practice while great in theory.

In other words, like most French scholars working in French agricultural history, including the late Marc Bloch, Mr. Bourde is sure that, despite the fact that agrarian conditions in France prevented an actual eighteenth-century agricultural revolution, at least there was a revolution in agricultural thought and that this revolution ran along lines set forth by English innovators. This idea is open to question.

There is no doubt that the French *agronomes* desired to introduce changes in French farming; there are, however, grounds for doubting that they wished to revolutionize methods along new and radical lines. They were, it seems to me,

rather reformers who sought to improve French agriculture within the frame of reference set by the past. Had the *agronomes* all committed themselves to the English view, they would have been remarkable failures. As it was, their ideas seem to square rather exactly with the course of French agricultural technology as practiced in the succeeding century and a half. Whether the *agronomes* were creative is a difficult question; at least they were not wrong. They were not, as a group, revolutionaries who failed.

The author seems to have studied all the pertinent primary and secondary material. The Bibliography is excellent and should prove useful to any scholar interested in French eighteenth-century economic history. The prose leaves a great deal to be desired.

DAVID J. BRANDENBURG, *American University*

The Decline of Agrarian Democracy. By Grant McConnell. Berkeley and Los Angeles: University of California Press, 1953. Pp. 229. $3.75.

This is a study of agricultural pressure groups. Grant McConnell, a member of the Department of Political Science of the University of California, believes that agrarianism in the United States has been transformed in the twentieth century and that the monumental fact of the last five decades has been the rise of "a structure of political power based on farm organization." This "not only represents a repudiation of the traditional agrarian distrust of power, but in its development has been the direct cause of some of the most disturbing passages in American politics." As he sees it, the American Farm Bureau Federation—to a large extent a publicly sponsored but privately controlled organization—has become the principal instrument of agricultural power. The Farm Bureau came into existence as a direct result of agricultural extension work, particularly that of the county agents who, although paid partly by federal funds, have been answerable to the extension services of the various state agricultural colleges. This academic connection has shielded the agents from political control. The county Farm Bureaus, basic units of the American Farm Bureau Federation structure, were organized by the county agents, most of whom were dominated by the Seaman Knapp ideal of working with the leading farmers of the county. Thus the Farm Bureau has tended to be an organization from which small farmers are excluded. The educational costs of the involvement of the agricultural colleges has been large: "they are measured in terms of blindness within the colleges and suspicion of their integrity from without" (pp. 164–65).

Mr. McConnell traces Farm Bureau influence on farm legislation from the 1920's to the present. Much of what the Farm Bureau has done displeases him, but he reserves his bitterest words to describe the long and ruthless campaign by the Farm Bureau to dismantle the Farm Security Administration—an agency which, in the author's opinion, "represented the greatest innovation in agricultural policy since the passage of the Homestead Act" (p. 96).

Much that Mr. McConnell says about the behavior of the Farm Bureau is to the point, although he has exaggerated the prescience and the power of Farm Bureau leaders. In fact, his attitude toward the management of the bureau sug-

gests some of those journalistic pictures of the men of the Kremlin who play their sinister and secret game of power politics constantly, brilliantly, without conflict among themselves, and without error. Indeed, at one point he even compares the operation of the Farm Bureau with that of the Communist party (p. 165). This study suffers also from the fact that it seeks to deal with the structure and behavior of farmer organizations without reference to the profound changes that have come about in farming during the years under discussion—changes symbolized by mechanical cotton pickers, self-propelled combines, and the hybrids. Come to think of it, there is very little in the book about farmers either.

VERNON CARSTENSEN, *University of Wisconsin*

Surveys of the Manors of Philip, First Earl of Pembroke and Montgomery 1631–2. Edited by Eric Kerridge. (Publication of the Wiltshire Archaeological and Natural History Society, Records Branch, Volume IX, for the Year 1953.) Devizes, 1953. Pp. xiv, 178. £1.5*s*.

This latest volume of Wiltshire records is valuable on two counts. The documents themselves are a useful addition to source materials for seventeenth-century agrarian and social history. The introductory essay, though brief, gives a workmanlike description of the manorial court in operation and particularly of the estate survey. It emphasizes once again the continuing vitality of the manorial community in the seventeenth century. The editor underscores his point very skillfully and usefully by publishing as an Appendix the agreement for the "flotting and watering of the meadowes" in the manor of Wylye in 1632. It neatly illustrates both the way in which custom was made in such a community and the co-operative character of these manorial societies.

An earlier survey of at least some of these estates was published by the Roxburghe Club in 1909 (C. R. Straton, ed., *Surveys of the Lands of William, first Earl of Pembroke*) so a significant comparison is possible. The surveys themselves, in English, are detailed and businesslike. They contain not only the crucial information on rents, fines, and terms of tenancy for each holding but also estimates of real value. Beyond these basic facts there is much interesting detail. The number of rooms in each dwelling house and the number of outbuildings on each holding are listed. There is of course detailed information on arable land and pasture rights. This set of surveys is voluminous enough to yield some statistical generalizations. It cannot be emphasized too strongly that this kind of material is grist for the historian of social structure as well as for those of agriculture and landholding.

WALLACE T. MACCAFFREY, *Haverford College*

Land and Peasant in Japan. An Introductory Survey. By Andrew J. Grad. New York: Institute of Pacific Relations, 1952. Pp. 262. $3.50.

This book is badly in need of a problem. It was written "to outline some of the basic factors operating in Japanese agriculture, to show how some of

these factors were altered, first by the war and then by the Occupation, and finally to indicate some of the problems that will remain or emerge with the removal of Occupation controls and American economic aid to Japan." But these "factors" and "problems" are chosen without reference to any criterion of relevance, with the result that the book lacks both unity and point. The author discusses a long list of such topics as the family and agricultural technology but from no particular viewpoint, including under these rubrics whatever data and judgments strike him as interesting; and he makes almost no attempt to relate data under one topic to those under another. For example, the book opens with an elaborate division of Japan into agricultural regions (sixteeen of them, I believe) on the basis of climate and income per household, which are undeniably important factors in Japanese regionalism, but, having defined these regions at the outset, he makes no significant use of them subsequently. Either the regional concept is of no use to the book and should have been omitted, or the reader must do all the work to give it meaning himself. All of this makes for dull and unrewarding reading. Nevertheless, the book contains much statistical data not otherwise easily available, and it should prove useful as a kind of statistical source book on Japanese agriculture.

THOMAS C. SMITH, *Stanford University*

TECHNOLOGY

The World of Eli Whitney. By Jeannette Mirsky and Allan Nevins. New York: The Macmillan Co., 1952. Pp. xvi, 316. $5.75.

The broad outlines of Eli Whitney's achievements, especially as the inventor of the cotton gin, have long been known to students of American history. Whitney's role in the development of interchangeable parts manufacture is less familiar, and the story of the evolution of his ideas and methods in this area have been fragmentary at best. Moreover, Whitney as an individual remained a somewhat shadowy or legendary figure.

In their biography of the noted inventor, Jeanette Mirsky and Allan Nevins have filled most of the gaps in our knowledge of Whitney's life and have drawn a clear-cut picture of his personality. They have carefully described the social, economic, and political environment within which he operated and, by skillfully blending his correspondence with the narrative, have made it possible for the reader to trace the development of his ideas and philosophy and to relive his triumphs and disappointments.

The events that led to the invention of the cotton gin are fully described and reaffirm the impression that chance played an important part in drawing Whitney's initial attention to the problem. The significance of the personal relations between the inventor, Mrs. Green, and Phineas Miller in affecting the future course of Whitney's career is carefully evaluated. Especially noteworthy is the handling of the problems encountered by Miller and Whitney in attempting to enforce a monopoly over ginning operations, a plan that, had it been successful, would have brought them tremendous wealth. A closely

reasoned summary of this phase of Whitney's career indicates why this plan would probably have failed even in the absence of the hard luck that seemed to plague the venture.

The authors show clearly how the frustrations encountered in attempting to exploit the cotton gin turned Whitney's attention to the manufacture of firearms for the United States Government. Beyond the idea that, "I am persuaded that Machinery moved by water adapted to this Business would greatly diminish the labor and facilitate the Manufacture of this Article," Whitney was not conscious at this time that he was about to revolutionize manufacturing methods. As the authors point out, "His only aim was to establish a business and he thought in terms of what steps would secure him his goal. He was not the prophet but an instrument of the industrial order."

It is indicative of Whitney's failure to grasp initially the full implications of his methods that, instead of completing his musket contract in twenty-six months as originally specified, he did not deliver the last of the guns until ten years and six months after signing the agreement. Only his unshaken confidence in the soundness of his methods, the loyalty of his friends, and the tolerance of government officials made it possible for him to get the needed financial advances and to delay deliveries beyond the contractual dates.

This confidence and trust were justified. By the end of the decade Whitney had worked out the full details of interchangeable parts manufacture. He experienced the problems of "tooling up" without being able to call upon established machine builders for equipment—such machinery he had to design and make for himself. He had trained a labor force for a new industrial technique and solved the difficulties of contracting for supplies and scheduling their delivery well in advance of immediate needs. He developed a clear understanding of the importance of depreciation and obsolescence allowances as elements in cost. To this was subsequently added the important invention of the milling machine, which, because of his experiences with the cotton gin, he made no effort to patent.

How important was Whitney in advancing this particular type of manufacturing? It is clear that he was not the originator of all these ideas or practices. Even in America he was not the first to turn out standard parts; machine-made nails and metal teeth for wool cards antedated his muskets, although these did not have to be "fitted" into the finished product. Whitney's contemporary, Simeon North, made pistols by having his workers specialize on the various components that made up the completed arm, but he apparently did not utilize machinery to any great extent. It has been claimed that the Connecticut clockmakers anticipated Whitney's methods by stamping out the wooden parts of their clock works and assembling them.

The authors do not consider this specific point, but it follows from their analysis how important Whitney was as a catalyst; how significant a role he played as an innovating entrepreneur. His claim to fame as the father of interchangeable parts manufacture does not depend on the impressive number of individual inventions that should be clearly credited to him. It rests rather upon his total achievement of combining these various elements into a workable whole. In this sense he was the true innovator of the methods that in less than a half cen-

tury had come to be known as the "American system," and which were spreading in ever-widening circles.

No review can bring out the painstaking research that went into the preparation of this volume or the high quality of the finished product. The authors are to be congratulated on giving us at long last a definitive biography of this noted American that is a pleasure to read because of both its style and its content.

HAROLD F. WILLIAMSON, *Northwestern University*

Essays in Honor of Conyers Read. Edited by Norton Downs. Chicago: University of Chicago Press, 1953. Pp. xxii, 304. $5.00.

The *Essays in Honor of Conyers Read,* written by nine former students of that distinguished historian of Tudor England, cover a remarkable range of subjects in a remarkable range of styles and thus faithfully reflect the catholicity of interest of the scholar to whom they render homage. Only two of the essays, however, lie within areas of especial concern to economic historians.

In "Some Aspects of London Mercantile Activity during the Reign of Queen Elizabeth," J. R. Jones gives us a glimpse of some of the rewards awaiting historians who will systematically exploit the riches buried in the London Port Books. Mr. Jones's exploratory effort deals with only a single volume of the series—Michaelmas 1587 to Easter 1588. Thus in the nature of the case it provides no answers to questions about development—growth of trade, changes in trade goods, shifts in trading centers, destinies of individual commercial firms. It does tell us something about the principal trade area of English commerce in 1587, confirming the old notion that the massive foundations of English trade under Elizabeth lay along the north coast of Europe from the estuary of the Seine to the mouth of the Oder. Mr. Jones's essay also throws some interesting light on the difficulties of one of England's earliest monopolistic joint-stock trading ventures—the Russian Company—and he gives us at least a hint of who was who in the London trading community. Thus he has whetted a curiosity which it would take years of patient and probably collaborative work to satisfy.

More than a quarter of the *Essays* is given over to a long piece by John U. Nef, "The Genesis of Industrialism and of Modern Science (1560–1640)." Mr. Nef's stated purpose is to understand "the nature of the connections" between the genesis of industrialism and modern science in order "to clarify the changes in human outlook and purpose" due to their combined triumph (p. 200). The question therefore becomes primarily that of the relation of the new science from the death of Copernicus to the death of Galileo to contemporaneous industrial developments. Mr. Nef focuses his attention on England and France. In England the significant industrial change, associated especially with the new coal industry and coal-using technology, attached an unprecedentedly high value to cost- and labor-saving innovations and implied the supercession of the ideal of quality by the ideal of quantity. Between this change and the process taking place at the same time in the study of nature, where preoccupation with the qualities of things

was also giving way to concern with quantities, Mr. Nef believes he detects "a striking analogy" (p. 209).

Before 1560 science had not emancipated itself from the workshop and the philosopher's study. Mr. Nef suggests that this emancipation—the attainment by science of an independent status and of an independent prestige for its method of systematic experiment—found in England a favorable milieu provided by the prevalent industrial appetite for practical results and innovation. The general support that the investigations of William Gilbert and William Harvey received there and the ready acceptance of their revolutionary discoveries about the magnet and the circulation of the blood illustrate the impact of England's early industrialization on scientific enterprise.

In France on the other hand the course of industrial evolution from 1560 to 1640 lay in the direction of increasing stress on quality. Based on an invidious distinction, the bounds remained firm between the craftsman who wrought things with his hands and the thinker who juggled ideas in his head. So in France, bracketing Gilbert and Harvey as it were, we find observer-contrivers like Paré and Palissy and speculative mathematizers like Desargues, Fermat, and Descartes. The preoccupation with mathematics of the latter three and of other upperclass Frenchmen was unconnected with any industrial exigency of the era. It seems to have had its roots in the purely speculative interest aroused by certain mathematical problems posed but not solved by the Hellenistic Greeks. Yet in the development of modern science and in the subsequent application of science to the solution of industrial problems, the innovations of the mathematicians were of no less consequence than those of the experimenters, becoming indeed inextricably intertwined with them. The conclusion that Mr. Nef draws from this observation and a number of others is a model of sane and moderate judgment: although, given the concurrence of the scientific and the early industrial revolution "it is not unnatural to assume that one was the cause of the other" (p. 258), in fact "the more one considers the direct connections" between them, "the more they seem superficial" (p. 261).

In this essay, as elsewhere over the past several years, Mr. Nef dilates on the cataclysm of values attendant upon the triumphs of modern science and modern industry. Without presuming to make a judgment on the general thesis, its presentation here is far too cursory to be persuasive.

J. H. Hexter, *Queens College*

Round about Industrial Britain, 1830–1860. By C. R. Fay. [The Toronto Lectures.] Toronto: University of Toronto Press, 1952. Pp. ix, 227. $5.50.

One could not find a more sprightly and learned guide through the industrial towns of Britain than C. R. Fay. As a lecturer conducting his audiences on a geographical and historical tour, Mr. Fay must have been both engaging and instructive. Drawing on the special knowledge of ten other experts as well as his own, he has brought together some excellent material. As a book, however, this collection leaves something to be desired.

The plan of the work is original and provocative. The thirty-year period with which the book mainly deals is first set in the stream, flowing both before and after that period, of social education and of industrial invention. The tangle of the patent laws and practices in the middle nineteenth century is revealed, and a short historical analysis is made of the alum trade, the significance of which for the chemical industry has declined relatively only in the last several decades. Then follow the special studies, by Mr. Fay's collaborators, of industrial centers that experienced a notable expansion from 1830 to 1860. Urban developments are selected to illustrate the range of proliferating industries and their varying social consequences in the new mechanical age—Birmingham as an economically versatile focus for the finishing trades, Merthyr Tydfil as a rapidly growing coal and iron mining center, Bradford as a victor over other towns in the mechanization of the worsted industry, and the Clyde as a river fostering pre-eminent shipbuilding and marine engineering works. For these four areas a composite picture is given of industrial leadership, technological advance, improvements in transport, housing and health conditions, and political and social awakening of the working population. This is accomplished in the case of Birmingham by Asa Briggs in only six and a half pages. Bradford alone exemplifies graphically an instance of technological unemployment, that of the hand-combers. Another area, Birkenhead, is used to illustrate urbanization prompted by the congestion of an old port, Liverpool, and involving the conquest of the forbidding Mersey River through steam power. Less significant, though written in a lively manner, is J. W. Nisbet's brief account of the transient boom in the jute industry of Dundee and of golf in nearby St. Andrews.

The six areas mentioned are analyzed historically with varying degrees of success, but the changing prose styles make the readability uneven. Moreover, for the other regions the treatment shifts from one method or one aspect to another. Ten facets of Sheffield life and work are presented through several contemporary accounts, but a compilation of sources used for Manchester is confined to the cotton famine of the 1860's caused by the American Civil War. Collected sources are used also for a rather irrelevant scrutiny of Irish agriculture before and after the potato famine and of American finance in 1842–1843; in this chapter only the three pages concerned with Irish industry are really pertinent. Finally Mr. Fay himself in his own charming way discourses on Faraday in London rather than on London itself. Thus the main body of the book is a potpourri of historical materials rather than a genuine historical reconstruction revealing a coherent pattern.

In his concluding chapter Mr. Fay's jibe at the grand synthesizer Toynbee (whom he links with Marx and H. G. Wells as starting and ending with fixed ideas) seems to me unwarranted, but he has some wise comments on the need for synthesizing and for co-operative scholarship in the writing of economic history. His own generous impulses are evident in the comment, "A secretive or proprietary instinct at the outset of research is merely ludicrous."

Willson H. Coates, *University of Rochester*

The Farmer's Tools, 1500–1900: The History of British Farm Implements, Tools, and Machinery before the Tractor Came. By G. E. Fussell, F.R.Hist.S. London: Andrew Melrose, 1952. Pp. 246, plus 111 illus. 42*s*.

One rarely sees so small a book packed so full of detail. In seven chapters covering 186 pages, plus 111 full pages of excellent illustrations, the author packs information on drainage, plowing and harrowing, seeding, harvesting, threshing, barn and miscellaneous machinery, and a retrospect. Cultivators are crowded into the chapter on plowing. Over two fifths of the text are devoted to drainage and the preparation of the seed bed, things in which the author seems to be most interested and which he does best. He pays little attention to foreign inventions, though many of them were utilized on British farms, and on pages 45–46 he seems to discount Jefferson's claim to the solving of the mathematics of the moldboard.

He is quite chummy in style, dragging himself into the discussion repeatedly with expressions such as "I think." But he also gets frightfully boresome at times. For example: "Ransome's of Ipswich won a silver medal for a Beart's brick machine improved by A. Stickney of Ridgemount, Holderness. John Read, 35, Regents Circus, Piccadilly, also received a medal for his cylindrical or pipe tiles," appears in a catalogue of names on page 35. Such detail might be useful for reference if Beart or Stickney or, as on page 32, M'Ewan, Alexander of Taylorston, Sterlingshire, or Heathcote of Tiverton, Devon, just to pick out a few from multitudes, were to be found in the Index.

In spite of the detail, it is not always possible to get a clear picture of the operation of the machines. On page 31 the reader is left in ignorance regarding how a mole plow provided an even fall for drainage on rolling land, and ten pages later Fussell quotes some egregious misinformation about wheels, with the approval of silence. On page 24 the author contradicts himself in the space of five lines.

While reading, with profit, the wealth of information in these pages, I may have nodded occasionally when plowing through unthinned fields of names and places, but, for one reason or another, I found no mention of harness, apple pickers, grubbing implements, hoes, sickles, scythes, cradles, axes, saws, carts, wagons, or sleds, though there is an illustration of men mowing with scythes facing page 119.

The back of the book contains the notes, a chronology of tools, an inadequate Glossary, the Bibliography, an Index that needs replowing, and a complete list of the works of G. E. Fussell, F.R.Hist.S.

I would overlook all minor deficiencies and hail this book as a landmark if only the Index were adequate.

Fred A. Shannon, *University of Illinois*

French Inventions of the Eighteenth Century. By Shelby T. McCloy. Lexington: University of Kentucky Press, 1952. Pp. x, 212. $4.50.

Not many years ago, technology seemed to dominate research and writing in the field of economic history. The pendulum has since swung sharply toward

sociological analysis, but it is not unlikely that we shall soon witness a return swing giving renewed attention to invention and technology integrated more fully than before with the general history of economic development. The sociology of invention offers a superb challenge to the analytical historian.

Regrettably, the book under review does not meet this challenge. The author occasionally catches the romance of invention. He offers some suggestions on why it might be true that the French invent and others exploit the fruits of their genius. But his parade of French inventions of the eighteenth century rolls by, ordered generally in functional categories; it is not organically related to the process of French society or to French culture. As a review of an interesting subject, the book is of value, but it seems unfortunate that it should not have been written from a more analytical point of view.

EUGENE O. GOLOB, *Wesleyan University*

Refrigeration in America. By Oscar Edward Anderson, Jr. (Published for the University of Cincinnati.) Princeton: Princeton University Press, 1953. Pp. ix, 344. $6.00.

Refrigeration in America is large in theme rather than in size; within little more than 300 pages of profusely annotated text, accompanied by a brief but critical Bibliographical Note and an ample Index, Oscar E. Anderson, Jr., professedly relates the "History of a New Technology and Its Impact," but it is equally the history of an industry, of a business, and indeed of a whole way of life as peculiarly and distinctively American as iced drinks, frozen foods, and the domestic refrigerator. The integration of technological evolution with economic, business, and social factors of growth is executed skillfully and with an abundance of detail drawn from many sources. It was a handicap, but also a challenge, to the author that he was concerned here not merely with a single, or even a particular segment of industry, but with a process and a product impinging upon many industries and agriculture and transportation as well. While the scene is predominantly American, the story rightly reaches out beyond the seas, particularly to Europe, for significant comparisons, origins, and technological contributions. There is much of value and interest here for both the historian and the economist and especially illuminating new material for the student of the factors of industrial and agricultural location. A few illustrations re-create certain quaintly obsolete features of ice harvesting and ice distribution still within the nostalgic memory of older readers. The chief difficulty, however, of any but the technical specialist in this field may perhaps lie in the rather prosaic and rapid succession of names and data comprising the long and intricate evolution of refrigeration technology, at times creating a congestion of facts that threatens to obscure basic trends and effects.

The plan of the book and the resulting sequence of chapters reflect the comprehensive scope of its theme and reveal both the forward progression of refrigeration technology chronologically and its transverse spread across the broad pattern of American industry, agriculture, and transportation, as well as household economy. Following a brief introductory survey of the natural ice age, the main

body of the work is concerned with the invention and application of mechanical refrigeration to an expanding variety of uses since 1860, and particularly since 1917. To some extent the continuity of the development is interrupted, and there is an unavoidable overlapping of material as successive chapters become almost separate and compact treatments of refrigeration in particular industries, each with its distinctive set of technical, business, and even legal problems.

Concluding chapters introduce and project the promising vistas of such contemporary and revolutionary innovations as commercial frozen foods, deep-freeze units, and temperature control both in industry and in the home. A final chapter presents a case survey of the Tennessee Valley Authority, illustrating the role of its refrigeration program in the drastic reconstruction of rural occupations and rural life in that area. This summary is subject, however, as is perhaps the entire book, to the caution that refrigeration technology is only one among many factors responsible for the transformation of modern American economy and life.

SAMUEL REZNECK, *Rensselaer Polytechnic Institute*

LABOR

Sidney Hillman: Statesman of American Labor. By Matthew Josephson. Garden City: Doubleday and Co., 1952. Pp. 701. $5.00.

Sidney Hillman, judging by the number of enemies he made, was one of the most important Americans of this century. He was an ideal target in many ways: a trade union official, of foreign birth, of Jewish faith. But his greatest sin was probably his effectiveness. Matthew Josephson here gives us the detailed chronology of how and why Hillman was so effective. The first half of this book centers on the formation and growth of the Amalgamated Clothing Workers. The last half treats Hillman's role in the N.R.A., the C.I.O. Labor's Non-Partisan League, the defense program in the Second World War, the C.I.O. Political Action Committee, and the World Federation of Trade Unions.

Matthew Josephson has told this fascinating story at full length in a work that is historical in the best sense. The section on the Amalgamated especially gives the feel of a union developing, hammering out its policies in the course of conflict, growing in its understanding of the total situation and of the ways to cope with it. The situation itself changes constantly as Josephson deals with the union in the context of the clothing industry and its surrounding climate of law and opinion. This approach makes clear the logic of Hillman's widening career: he went to Washington to save the Amalgamated; he helped start the C.I.O. to save the Amalgamated. Another merit of Josephson's study is his extensive canvass of the sources. In addition to published works, he has used Hillman's papers, the Roosevelt papers, the files of the union, Jacob Potofsky's written reminiscences of Hillman, and countless interviews with Hillman's associates. These wide labors have enabled Josephson to turn up many significant facts, as, for instance, President Roosevelt's part in stifling the move by John L. Lewis and William Hutcheson in early 1942 to unite the A. F. of L. and the C.I.O.

Although the general outlines of Josephson's account seem to me sound, the book has serious weaknesses. It makes almost no use of statistical data. It only touches on the methods employed by the Amalgamated in reconciling the interests of its skilled and unskilled members. Many of the details are inaccurate. Josephson makes a mess of Selig Perlman's theory of trade-unionism by substituting the word "unlimited" for "limited" in a quotation (p. 108*n*.). The volume deals almost exclusively with Hillman's public career. Even within that limitation, there is an official flavor to it. Finally, I am doubtful about some of Josephson's interpretations, especially in the last half of the book. He exaggerates the differences between the Hoover Administration and the first two years of Roosevelt's Administration. He seems to accept the claim made by Hillman in 1936 that he had learned to think "in terms of the whole labor movement." On the contrary, it seems that Hillman tended to think in terms of the experience and interests of the Amalgamated Clothing Workers. This would account for his ardent support of the N.R.A. and for his failure to grasp the problems involved in the campaign to unionize autos and steel.

RAY GINGER, *Harvard University*

Wages, Earnings and Employment—N., C. & St. L. Railway, 1866–1896. By Rendigs Fels. (Institute of Research and Training in the Social Sciences of Vanderbilt University, Paper No. 10.) Nashville: Vanderbilt University Press, 1953. Pp. 72. $1.00.

This little pamphlet is significant for economic historians out of all proportion to its size. In 39 pages of text and 28 more of Appendix, Rendigs Fels has presented the results of a pilot study of the payrolls and certain other statistical records since the Civil War of the Nashville, Chattanooga and St. Louis Railway Company. Few corporation records so detailed and comprehensive have survived, and few corporate managements have shown the interest in quantitative economic history exhibited by this railroad.

The main results of the statistical analysis of the series can be summed up as follows: (1) Real wages of laborers on the N. C. & St. L. in the period 1866–1896 showed an absolute decline while real wages of conductors and brakemen in general were rising. (2) Real wages of the railroad workers studied failed to advance as rapidly as those of labor generally in the United States. (3) Total employment reflected the major business cycles in the period and grew faster than main-line mileage, reflecting higher density of traffic. (4) Passenger miles increased only three times over the period compared to an increase of five times in mileage operated, but freight ton-miles increased 12½ times between 1867 and 1896, accompanied by a decline in freight rates. "Evidently the N. C. & St. L.'s major contribution to the economic life of its community lay in carrying an increasing volume of traffic at decreasing rates" (p. 33). (5) The share of gross revenue going to wages and salaries declined drastically from 1868 to 1878 (from about two thirds to about one third). From 1878 to 1896 the shares going to dividends (averaging a little over 6 per cent) and to wages and salaries (about one third) remained fairly stable while the share going to interest on funded debt declined.

(6) The chief factors in the favorable showing of the railway were external economies, economies of scale, good management, technological progress, and probably increased capital per worker. The policy of plowing back earnings to improve plant and equipment seems to me to illustrate a prominent characteristic of the capitalist *geist*. Unfortunately, the statistics did not allow even an estimate of the annual new investment, nor did they apparently permit any study of traffic densities with relation to system capacity, which might have thrown light on rate policies.

Aside from the interesting conclusions reached in this study, it is significant not only as an eminently successful essay at quantitative measurement in economic history, with for the most part adequate data and appropriate statistical techniques, but also as an illustration of the successful combination of theory and history. Here was an enormous body of facts and figures, requiring organization and interpretation. What questions could they answer? What would we like to know about the behavior of prices, wages, employment, revenue, and so on for this period? The historian unequipped with some theoretical framework is lost. Fortunately, Mr. Fels and his co-workers knew their way. Credit is also due to the railway company and to the Committee on Research in Economic History. It is to be hoped that the study can be extended from 1896 to the present.

Joseph T. Lambie, *Wellesley College*

British Trade Unionism, A Short History. By Allen Hutt. New York: International Publishers, 1953. Pp. 200. $2.25.

Reprinted for the American party faithful is the fourth edition of Allen Hutt's abbreviated account of British labor history. Beyond serving as a ready reference for a functionary in need of predigested material on the subject, this slender tract is lacking in scholarly value—except as a document itself.

After underscoring every labor disturbance for the past century and a half that can serve to illustrate the class struggle, Mr. Hutt, in a newly added chapter, concludes his effort with a look to the future. If the living standards of the British worker are to be maintained, he writes, they must oppose rearmament and join with "the peace-seeking forces in the world—the Soviet Union, the Peoples' Democracies, People's China—and [make] a break with aggressive America."

For those who seek a brief survey, G. D. H. Cole's *Short History of the British Working-Class Movement* is still recommended.

Louis H. Arky, *University of Illinois*

Strikes: A Study in Industrial Conflict, with Special Reference to British Experience between 1911 and 1947. By K. G. J. C. Knowles. New York: Philosophical Library, 1952. Pp. xiv, 330. $8.75.

There has been little study of strikes in England. The purpose of K. G. J. C. Knowles, of the Oxford University Institute of Statistics, is to fill this gap in

English labor history by a pioneer study which will "draw attention to the tenuity of sound and systematic data, in the hope that the position may be thought worth correcting" and "put strikes in their wider economic and social setting" so as to "clear the air of narrow and oversimplified conceptions" (p. xiii).

The first part, entitled "The Background of Strikes," occupies a little less than half of the volume. It covers a wide range of labor history, outlining the growth of unions and employers' organizations, the development of employer-employee relations, the increasing part played by government in these relations, and the measures, legal or otherwise, taken to bring them under control. The treatment is judicious and impartial. The intelligent general reader, however, who would like to read at least this part of the study may be discouraged by Mr. Knowles's assumption that his readers will be equipped with an extensive knowledge of British labor and general economic history and of the practices and vocabulary of the British labor movement. He alludes continually to things which he does not feel the necessity of explaining. Those who are in training to take it will find in this first half a scholarly, concise, and suggestive treatment of labor developments and ideas related to them, based upon an extensive knowledge not only of the English writings in this field but also of those produced in other countries.

The second part, "Causes and Effects of Strikes," although statistical, is much more than a series of tables and graphs. The explanations and comments delve into all sorts of practices, conditions, and ideas that may affect the validity of the figures or explain the results of the figuring. Mr. Knowles's use of statistics is cautious and experimental. The data he has found available, mainly the official figures published in the *Labour Gazette* or the *Abstract of Labour Statistics*, are not all that might be desired, and he calls attention to the need of field work to broaden the base of statistical operations. In general, his position is that in any study of human relationships it is seldom possible to measure mathematically with sufficient accuracy to prove anything scientifically but that statistics may be usefully employed to describe phenomena more precisely than could be done without them. He has experimented with the data he has been able to find ready-made, analyzing critically both his data and his statistical treatments, trying to show what diverse factors may have affected the results. When the results are inconclusive, he does not hesitate to say so. From the numerous tables and graphs, certain more or less tentative conclusions emerge. Among them are the following: The size and length of strikes are more likely than their frequency to reflect the influences of union policy and of the prevailing political atmosphere. Both reached a peak in the period ending in 1926, the year of the general strike, and since then both have declined. The trend toward short strikes is explained in part by the development of machinery for negotiation and by the increasing use of "token" or "lightning demonstration" strikes. The danger of relying too much upon averages and simple explanations appears in an interesting regional analysis which shows, among other things, that two regions having very similar industrial conditions have had a decided difference in strike incidence: the explanation may lie largely in the imponderables of regional character. "Strike proneness" in the principal industries has been greatest in mining, next greatest in textiles, and least in transport. The analysis of the

most important immediate causes of strikes shows that those involving wages and hours have had a marked decrease and those for trade-union principles, such as union recognition, have declined less. Those involving working conditions, rules, and discipline have increased. Statistics on the results of strikes show an increase in the proportion won by the employer, especially when the strikes were longer and less frequent. When they were shorter and involved more men, more were won by the strikers or were compromised. The direct economic effect of strikes has been less than many have supposed: the figures do not seem to show that they have caused a very large part of the wage increases that have been granted, and the number of working days lost on account of strikes is an almost infinitesimal part of the total number of days worked, and even a small fraction of the days lost on account of holidays, accidents, sickness, and other absenteeism.

The author has accomplished very successfully the task to which he set himself, with keen insight into its complexities. It is unfortunate that he did not add a formal bibliography. The documentation in footnotes is full, but the bibliographical information is often incomplete. The Index is too brief to be useful.

DONALD L. MCMURRY, *Dryden, N.Y.*

DIVERGENT ECONOMIC SYSTEMS

Il Populismo Russo. By Franco Venturi. (Biblioteca di cultura storica, 46.) Turin: Giulio Einaudi, 1952. Two volumes. Pp. xvii, 633; 635–1194. L. 6,500.

With reference to nineteenth-century Russian history, the term "populism" *(Narodnichestvo)* is used in two senses. In a broader sense, it means that intense and emotionally colored preoccupation with the fate of the "people" that was characteristic of many Russian intellectuals of the period. The fact that "people" was usually identified with the peasantry led the late Samuel N. Harper to render *Narodnichestvo* into English as "peasantism." It took different forms, but in all of them one finds a tendency to treat the "people" in contradistinction to the cultural elite and a strong moral urge to "understand" and to "serve" the "people." Very often, this attitude was combined with an idealization of the peasant, who was seen as the bearer of various cardinal virtues. Populism, in this general sense, was a potent factor in Russia's cultural and intellectual history. It found its expression in nineteenth-century Russian literature, art, music, even scholarship, as well as in social work and educational activities.

The original meaning of the term, however, was of a more narrow scope. It first was applied to that phase of the Russian revolutionary movement that began in the middle of the nineteenth century and reached its height in the 1870's. From the outset, this movement took on a pronounced socialist character, but, in contradistinction to the latter-day Marxism, it was primarily an agrarian socialism—a fact that can be easily explained by the then prevailing economic and social conditions within the country.

It is with populism in this last, more technical, sense that Mr. Venturi is con-

cerned in the present book. As he tells us in his Preface, he deliberately has excluded from his discussion the broad cultural and intellectual manifestations of the populist trend, concentrating on the history of revolutionary populism. Neither does he go beyond 1881, leaving out what might be called neopopulism as exemplified by the Socialist-Revolutionary party that emerged at the turn of the century. Within these topical and chronological limits, he has given us the most comprehensive treatment of the subject that can be found in any language. It is based on a thorough knowledge of Russian sources and secondary literature, it is richly supplied with excerpts from the original documents, and it is notable for its factual accuracy and completeness. Although no formal bibliography is attached, there is a wealth of bibliographical information in the copious footnotes. Throughout, the author's judgment remains sure and sound, and occasionally his comment stresses some heretofore neglected points. His attempt to link Russian populism with contemporary western socialism has been carried out with due regard to the peculiarities of the Russian scene. The outstanding theoreticians and practitioners of revolutionary populism are given ample treatment, and there are chapters dealing with such topics as peasant disturbances, the beginnings of the labor movement in the cities, and the political agitation among the university students. The bulk of the book, however, is formed by a detailed account of various revolutionary organizations and their attempts at antigovernmental action.

One could wish, perhaps, that Mr. Venturi had devoted more space to a discussion of the economic views of the Russian populists. Typical of many of the populists was their belief in Russia's "exceptionalism," and, more particularly, in the possibility for Russia to escape the capitalistic phase of development. Connected with this was a highly optimistic estimate of the potentialities of the Russian village commune, viewed as a nucleus of the future socialist society. Even those of the populists who were fully aware of the actual growth of capitalism in contemporary Russia either insisted that it could and should be destroyed by immediate revolution (Tkachev) or else consoled themselves with the thought that its belated appearance would make it peculiarly vulnerable to revolutionary assault whenever it might come (Lavrov). To be sure, Mr. Venturi does deal with this set of problems, but in my opinion he has not given them all the attention they deserve.

The book is beautifully printed, supplied with many illustrations (mostly portraits and photographs of populist leaders), and contains a chronological table, a name Index, and an Index of Russian periodicals cited in the text.

MICHAEL KARPOVICH, *Harvard University*

El sistema económico en las misiones Jesuíticas. By Oreste Popescu. Bahía Blanca: Editorial "Pampa-Mar," 1952. Pp. 125.

Scholars who have studied the Jesuit missions in the colonial Province of Paraguay have been baffled in attempting to place them properly within the framework of economic theory. Oreste Popescu believes that lack of objectivity and a faulty knowledge of the theory of economic systems have caused his-

torians to be hopelessly lost in a mass of amorphous data. This review of the Jesuit missions, therefore, should provide data for theoretical economics and relate the missions to this larger field of inquiry.

Depending largely on well-known works for his basic data, Mr. Popescu analyzes the mission economy in terms of such opposites as traditionalism-rationalism, barter-money, solidarity-individualism, private property-collective property, direction-freedom, self-sufficiency-trade, individual enterprise-social enterprise, and so forth. In each chapter devoted to these concepts, the dominating characteristic is clearly defined although exceptions are noted.

While the Guaraní was a traditionalist, the Jesuits were economic rationalists. The missions were not capitalistic. *Solidarismo,* or solidarity, was the outstanding feature of mission economy: individualism, while neither destroyed nor discouraged, was subordinated to the group interest. Private property existed together with collective property; work was done individually and in groups. There was complete central administration of a national system within which little deviation occurred. Self-sufficiency, not trade, was the dominant trait of each mission and of the entire system. Handicrafts were primarily collective. Although collective property was the rule, private property was the ultimate objective—the reverse of a true socialism.

Within the noncapitalistic class of societies, Werner Sombart places a precapitalistic self-sufficiency group, further subdivided into democratic and aristocratic economies. Since either slavery or servitude exists in the two aristocratic types, a new type must be added: the theocratic type of the Jesuit missions. With this conclusion, Mr. Popescu believes he has completed the Sombartian system.

On the whole, I see no reason to quarrel with this intelligent analysis. Unless further research in original sources reveals unsuspected dominant traits, we may confidently refer to the Jesuit missions of Paraguay as an economic theocracy. This classification, however, should not be applied carelessly to other Jesuit missions—in Tarahumara and Baja California, for example—until they, too, have been subjected to a similar analysis.

HARRIS GAYLORD WARREN, *University of Mississippi*

Built of Men, The Story of Indiana Cooperatives. By I. Harvey Hull. New York: Harper & Bros., 1952. Pp. xii, 212. $3.00.

Built of Men is an account of the growth, aims, accomplishments, and the problems faced by Indiana co-operatives as seen through the eyes of an administrator. Writing from his personal experiences as a co-operative head, I. Harvey Hull has purposely geared his narrative to satisfy the needs of teachers, farm organizers, preachers, and others who minister to the needs of the rural community.

According to Mr. Hull the Indiana co-operatives, especially those sponsored by the Farm Bureau, were inspired by the need for preserving the individual family-sized farm. It was menaced by the growth of "monopoly-seeking enterprises," the powers of which were literally left untouched by the failure of legislation

to curb them. Co-operatives were organized as a means for uniting the buying and selling powers of the farmers. Theirs was "the middle way," the "way of self-help," that made it possible for the farmers to meet the bargaining power of the great corporations and thus ensure the preservation of the family farm. But success was not instantaneous; it came after many trials and errors and the overcoming of powerful opposition. In the end, the co-operatives succeeded because they were conducted on business principles. They grew in numbers because they brought better prices to the producer, lower prices as well as better quality to the consumer, strengthened the economic base of our democratic society by protecting the weak from the strong, and curbed the growth of radicalism. Besides bringing savings to the farmers, the co-operatives, by helping to locate plants in rural communities, contributed to the decentralization of industry. By fostering trade between international co-operatives, they helped promote good will between peoples. Farm Bureau enterprises are the ones receiving most of the attention. The "non-Bureau" associations treated include livestock marketing groups, dairy "co-ops," credit unions, co-operative insurance, and electrical units.

The main limitations of the book are the very things that give it strength. If the author is long on his experiences as an administrator, he is equally short on the more basic causes that contributed to the growth of co-operatives. To attribute it solely to the dangers of "monopoly-seeking enterprises" savors too much of the vote-seeking politician on the eve of an election. "Monopoly" was but one of many instead of the sole factor. Contrary to what he says on page 5, wholesale agitation commenced long before the First World War period and the aftermath. His claim that this is the first treatment of co-operatives on a state-wide basis is a dubious distinction. The author himself indicates that the factors which precipitated the wholesale growth of the movement were regional or national. At times his Olympian attitude becomes a bit irritating and his philosophizing pedestrian. The membership figures cited are impressive, but if they are taken too literally they will give one an unrealistic picture of Indiana co-operatives. Many an individual farmer belongs to a series of commodity associations and is counted a member four or five times.

The greatest value of the book lies in the wealth of factual data it contains. Only a man with the background of Mr. Hull would be able to unearth and compile it. When a sufficient number of local and regional studies are completed, we shall have the materials for that general treatment of co-operatives that is long overdue. The author has contributed his share toward that end.

THEODORE SALOUTOS, *University of California, Los Angeles*

California's Utopian Colonies. By Robert V. Hine. San Marino, Calif.: The Huntington Library, 1953. Pp. xi, 209. $4.00.

In the century following California's admission to the Union in 1850 some seventeen communitarian colonies were founded within the borders of the state. Robert V. Hine gives an account of each of these, devoting one chapter apiece to

the six most important, describing the others in briefer sections, and offering a few generalizations at the end. His research has been painstaking, as his valuable bibliographical essay reveals.

Despite the conscientiousness of the author, his volume throws little new light on the social history of the United States or even of California. Only two of the experiments, Kaweah (inaugurated in 1885) and Llano del Rio (founded in 1914), can be said to have had any vital connection with significant economic and social movements during their periods. Mr. Hine treats these relationships in a rather perfunctory fashion; consequently, certain earlier studies of these two communities must be judged more perceptive than this one. Of the six communities that he considers of major importance, two others, Fountain Grove and Icaria Speranza, were mere continuations of earlier experiments. Adequate monographs covering the whole history of each of these communities already exist, and little that is new is added here to the last and least important phase of the story. The chapter on the theosophical community at Point Loma (a cultist experiment that was more curious than important) is freshly written from the sources, but the Bibliography cites and praises an unpublished doctoral dissertation on the subject that must undoubtedly be more comprehensive and detailed than Mr. Hine's 25-page account.

The other twelve colonies are minor eddies indeed in the stream of social and economic thought, as Mr. Hine well recognizes. New facts about them are welcome, of course. But in the aggregate they seem to me to underline a conclusion I have stated elsewhere: "For most American reformers in an industrialized age, communitarianism was a tool that had lost its edge, probably forever" (*American Historical Review,* LVIII [April 1953], 526).

ARTHUR E. BESTOR, JR., *University of Illinois*

ECONOMIC THEORY

A Review of Economic Doctrines, 1870–1929. By T. W. Hutchison. New York: Oxford University Press, 1953. Pp. xiv, 456. $6.00.

Any historian of thought has two problems that he must solve. He must decide whether he will attempt to discuss individual writers and try to present each man's contribution systematically or organize his book about ideas or concepts as such and show how each concept in turn developed and was refined by different writers. He must also decide whether he wishes to convey to his readers the "doctrines," or general conclusions, of the writers he selects as important or to ask his readers to follow the analytical processes and methods by means of which original thinkers have reached their conclusions. T. W. Hutchison has compromised on the first problem. The economists from Jevons to Irving Fisher are treated as individuals, and their systems of thought are studied against a helpful and sufficient background of the economic conditions and the general intellectual climate of the contemporary period. It is certainly

desirable, if one is to understand what Sidgwick, for example, was trying to say, to know something of English economic life in the second half of the nineteenth century and something of the intellectual ferment and the intellectual preoccupations of Cambridge at the time. Our author is most skillful in showing us not only how his great economists tackled their problems but why they selected the problems they did for analysis. In this part of the book, too, Mr. Hutchison is more interested in political economy, in doctrines and conclusions, than in pure analysis.

In his second and third parts, entitled, respectively, "From 'Static' to 'Dynamic' Analysis" and "The Economics of Instability and Disturbance," he changes his method and point of view. In these parts he traces the development of ideas as such and becomes increasingly interested in analytical techniques and processes.

Our judgment of a book of this sort inevitably depends on our assessment of the purpose it is meant to serve. Mr. Hutchison seems to be writing for an audience of advanced students and fellow economists. To such readers he brings the assistance of his very real erudition, which enables him to throw new light on the economists of the nineteenth century. There is not much new, perhaps, in what he has to say in his descriptions of their systems, but the manner in which systematic thought is thrown against the general historical and intellectual background is illuminating. In my opinion Mr. Hutchison is more successful with the British economists than he is with the Continentals. I single out the chapter on Wicksteed, which seemed to me to exemplify Mr. Hutchison's method at its best. The second and third parts of the book have the great merit of reminding economists of this generation how very much we owe—too frequently in the form of unacknowledged debts—to our predecessors who began to make the first approaches to the study of the business cycle and economic development. These parts have, however, the drawback, imposed by the selection of 1929 as the limiting year for the study, of failing to show how the earlier ideas and explorations have been further developed. To gain a full appreciation of these pages the reader will need to have a good knowledge of contemporary economics. Indeed, American teachers, who may wish to consider this book as a possible textbook, will find that the author takes for granted a much greater familiarity with the general literature than will be justified in the case of their undergraduate students.

The book is well written in a clear, lucid style that combines elegance with readability and sustained interest. May I finally say a good word for the publishers, since I share the usual authors' suspicion of the people who mangle our favorite productions. In this case, a distinguished book has been given a distinguished format and has been beautifully printed.

B. S. Keirstead, *McGill University*

Stand und Ständeordnung im Weltbild des Mittelalters: Die geistes- und gesellschafts geschichtlichen Grundlagen der berufsständischen Idee. By Wilhelm Schwer. With a Foreword by Nikolaus Monzel. (Görres-Gesellschaft zur Pflege der Wissenschaft. Veröffentlichung der Sektion für Wirtschafts- und

Sozialwissenschaft. Heft 7). Paderborn: Verlag Ferdinand Schöningh, 2d ed.; 1952. Pp. 99. D.M. 7.2.

The first edition of this work appeared in 1934. At that time it was considerably discussed by German scholars in related works. Two of them lectured on this subject in St. Paul and St. Louis and actually prepared an English translation, but it was never published owing to World War II and its aftermath. The present republication, Wilhelm Schwer having died in 1949, arises, according to its editor, Nikolaus Monzel, from the pertinency of the subject to the need for basic social reforms throughout the world as a consequence of the war.

The thesis of the work concerns the possible relationship between medieval and modern social theory. According to Schwer, medieval society was based on a contradictory ambivalence. In reality, it was a highly organized hierarchical structure grounded on power and heredity arising from a landed economy. At the same time, in accordance with Christian teachings, the church, though itself so organized, taught the equality of man before God. However, modern social organization is based on man's capabilities and economic status. It is Schwer's contention that there is no institutional basis in the Middle Ages prefiguring this change; that such a seemingly nonfeudal medieval institution as the craft guild, or the commercial organizations of the Lombard towns or elsewhere, does not contain the origin of this social change. We must seek for it instead in some kind of transmutation of the Christian brotherhood of man.

If it be true, as Schwer claims, that one can find no real roots in the Middle Ages for a new social order, that even the craft guilds are merely another expression of landed feudal society, one must then accept an ideological cause for a social change whose ramifications affect all aspects of society. From a historian's point of view, this metamorphosis would seem insufficiently undergirded.

Whatever may be the rightness or wrongness of Schwer's thesis, the work is provocative. It represents a summation of a vast amount of research and rethinking upon an intangible problem whose elucidation depends on definition and circumscription of definition in order to arrive at an answer to the origins of the present social order, an order that still retains some vestiges of the Middle Ages. Perhaps the projected English translation may be worth the printing in order to bring the controversial aspects of the problem to a wider public.

Francis S. Benjamin, Jr., *Emory University*

French Corporative Theory, 1789–1948. By Matthew H. Elbow. (Studies in History, Economics and Public Law, Edited by the Faculty of Political Science of Columbia University, No. 577.) New York: Columbia University Press, 1953. Pp. 222. $3.75.

This volume makes a most useful contribution in a field where serious critical works have been sorely lacking. While, as Matthew H. Elbow rightly remarks, studies on corporative theory and practice in various totalitarian countries have been plentiful, the many strands that have gone into the making of French corporative thought have never been analyzed outside France. And French studies

on the subject have usually borne the marks of definite, though often vigorous, partisanship.

By far the best and most valuable parts of Mr. Elbow's work are concerned with the history of the corporative ideas in the nineteenth century. It is true that the author relies occasionally, as for instance in the case of Proudhon, on secondary sources. But since, at least in the reviewer's opinion, his sources are clear and since he furnishes an altogether original analysis of the lesser writers in the field, the emerging picture of corporative thought is clear and carefully drawn. The chapter devoted to the life and doctrines of the foremost French "corporatist" of the last century, La Tour du Pin, is particularly interesting and enlightening, though here as elsewhere one sometimes wishes that the author would come somewhat nearer to the stylistic elegance of most of the French writers he has studied so carefully.

When Mr. Elbow proceeds to discover under the loose heading of "related schools" corporatist ideas in the syndicalism of Sorel and Paul-Boncour, in the solidarism of Durkheim, and the pluralism of Duguit, he is far less convincing than when he treats La Tour du Pin and the Social Catholics. I do not think that he has done justice to the contradictory thinking of Sorel; at any rate he fails to take into consideration recent American studies on the "apostle of violence." If the author wishes to subsume under the denominator of corporatist thinking a democratic pluralist like Duguit, just because he stresses the importance of secondary groupings existing between the individual and the state, terminology becomes blurred and is indicative of some theoretical confusion, which also mars other parts of the study.

On the whole the portions of the book devoted to intellectual history seem to me superior to those attempting to evaluate selected aspects of French economic history. Mr. Elbow shows, for instance, remarkable skill in guiding the reader through the confusing maze of corporatist propositions of the inter-bellum period and in clarifying the place the various writers hold in the differing traditions of corporatist thought. But when the author turns to what he calls the "trend toward a corporatist economy in France," his treatment is not only sketchy but at times misleading. To find listed among those "trends" the emergence of collective bargaining during the Popular Front period is strange enough. For the author's thesis it is more damaging that he never quite makes up his mind to what extent industrial ententes, *i.e.,* cartels and similar agreements, belong to any of the corporatist traditions. He analyzes, to be sure, the role Mathon, a prominent wool manufacturer, has played in extolling practical corporatist experiences. Yet the study does not even discuss the interesting fact that one of the most cartelized of French industries, the steel industry, represented by the Comité des Forges, was violently opposed to all corporatist ideas (while, of course, practicing a corporatism of its own brand).

The chapter that should be among the most interesting of the work clearly suffers from the author's difficulties in arriving at a conceptual framework which would permit the holding of corporatist dreams against corporatist realities. The discussion of corporatism under Vichy abounds in interesting quotations from Pétain's speeches; a fair analysis of the legislative measures is given, but here, where corporatist ideas could be tested against the significance of legal enact-

ments, the study remains hesitant in its conclusions. Even if the author did not feel that he had to examine in detail the functioning of the Vichy laws, would it not have been profitable to analyze more carefully the corporatist (or non-corporatist) content of the lengthy preambles to the laws instituting the Committees of Industrial Organization, the Labor Charter, and the like? It may be true that, as the author concludes, the Pétain regime was not a fair or just test of the workability of French corporative theories. But was that due solely to the German occupation as is suggested? The memoirs and writings of the principal actors on the Vichy stage suggest that the confusions and contradictions of Pétain's corporatists and the deliberate scheming of other forces would have been sufficient to land the French experiment where all such attempts have landed: in full-fledged *étatisme*.

The author's conclusions, though written with nuances and finesse, are similarly uncertain. All through his work Mr. Elbow has clearly and often with convincing irony highlighted the utopian character of French corporative theory only to express finally the hope that corporatism of a democratic brand may yet have an opportunity for a fair trial. In my opinion the author has failed to define what he means when he speaks of democratic corporatism and has not succeeded in showing which kind of corporatist arrangements would offer a practical solution to the economic and social ills of contemporary France.

All this, however, hardly detracts from the value of the study as a thorough comment on an interesting chapter of French economic and social theory.

HENRY W. EHRMANN, *University of Colorado*

BUSINESS HISTORY

International Shipping Cartels. By Daniel Marx, Jr. Princeton: Princeton University Press, 1953. Pp. xiii, 323. $6.00.

Since the beginning of the last quarter of the nineteenth century, ocean shipping conferences have been a prominent though little understood part of the maritime scene. Regarded by some as odious monopolies and by others as necessary institutions for the rationalization of what would be cutthroat or otherwise undesirable competition, they have been a cause of many investigations and much discussion. In this significant work Daniel Marx, Jr., reviews this material and subjects it to some economic analysis. For this task he is especially well qualified by virtue of his experience in the shipping industry and the United States Maritime Commission prior to becoming a professor of economics. In the preparation of the study he was able to make substantial investigations in Europe, especially in Great Britain, and hence the book reflects a distinctly international viewpoint regarding this problem. Combining both economic history and economic analysis, the work will be indispensable to students of maritime history and of shipping.

The fourteen chapters can be divided into three parts. In the first two the author presents the basic economic and political aspects of the ocean shipping

business. He has a very readable presentation of the factors affecting ocean rates in liner service, especially the predominance of fixed cost in the short run, and the chronic surplus of tonnage created by wars and nationalism. The next four chapters are devoted to summaries of the official investigations and legislation in various countries regarding conferences, starting with the Royal Commission on Shipping Rings of 1907 and ending with the administration of the United States Shipping Act of 1916. However, the American, British, and Dominion materials dominate, and comparatively little attention is given to such important maritime nations as Germany and Italy. Those economic historians who are not familiar with this background will find this material useful and interesting, but specialists are not likely to find anything new. The last seven chapters are devoted to the economics of ocean conferences and to the problems of public policy relating thereto.

The writer has relied very largely on public investigations and legal cases. Since a characteristic of conferences is secrecy, this limitation is probably inevitable. Nevertheless, some "inside material" on the reasons for conference actions would have given it more strength. It seems probable, however, that the ordinary steamship operator would be satisfied with the discussion of conference operations and motivation.

Many will find that the author's conclusions regarding the justification of conferences are unsatisfactory. Briefly, after reviewing almost fifty years of investigations, he reaches the same conclusions as the British Royal Commission of 1907. He finds that fixed costs and other factors necessitate some institution to ameliorate cutthroat competition and other undesirable practices. The conference is the best device yet worked out in the international area. However, unilateral regulation is desirable to prevent undue discrimination and other monopolistic abuses. The state of international relations unfortunately does not provide the proper foundation for effective international control. Finally, the prevalence of tramp and interconference competition and the weakness of conferences themselves serve to prevent execssive profits from being earned for any unduly long period. With all this the reviewer is disposed to agree. The author should be congratulated on having carefully weighed many conflicting proposals and on having come out with a balanced viewpoint regarding this difficult question. In short, although not a definitive work, this book is a valuable contribution to the understanding of an important and complex institution of the modern economy.

JOHN G. B. HUTCHINS, *Cornell University*

The Stark County Story, as Told in Radio Broadcasts. Vol. III. Industry Comes of Age, 1901–1917. By Edward Thornton Heald. Canton, Ohio: The Stark County Historical Society, 1952. Pp. xv, 822.

Volume III of *The Stark County Story,* a local history, furnishes illustrative data for several phases of American industrial life. The mention of many men and their activities in Canton, Ohio, points to the fact that the corporation is best treated historically as a tool of men, not as a separate and distinct, per-

sonalized entity. Several individuals invested in and managed numerous enterprises. Within the volume appears much information on businesses still existing as independent units in the economic order and on firms that have been or are now component parts of nation-wide organizations. Historians of the United States Steel Corporation, The Consolidated Natural Gas Company, and the Standard Oil Company (New Jersey), to mention three examples, can find in this book factual material worthy of consideration, if used discreetly.

Though packed with fact and anecdote, the book must be used with caution by the economic and business historian. Since every short broadcast had to be prepared against an almost immediate deadline, research must have been hasty, and opportunities for checking facts acquired by interviews and from house organs or newspapers could not have been extensive. The sections on the various men and firms lean heavily toward the human interest story and manifest slight indications of careful analysis. In fact, *Industry Comes of Age* is the raw material for a meaningful economic history of Stark County, not the carefully evaluated, polished analysis of local development so much desired by and so seldom available to the student of the growth of the American economy as a whole.

RALPH W. HIDY, *New York University*

Struttura e funzionamento della compagnia mercantile dei Peruzzi, con particolare riguardo all'aspetto bancario. By Giuseppe Murè. Rome: Bancaria, 1950. Pp. 153.

What might have been a work of synthesis that scholars and the serious reading public would welcome because it brings together material available at present only in a very expensive volume, in a book of collected essays that is out of print, and in numerous Italian journals, has instead been condemned as an example of intellectual dishonesty, the like of which has not previously appeared in the field of economic history.

Naturally, in a book written without footnotes, one cannot easily give a source for every statement that is a paraphrase of material already in print, but if one draws heavily on one or more authors due credit should be given in an Introduction or in a Bibliography, both of which this small volume possesses.

When some twenty years ago Armando Sapori (now professor of economic history at the University of Florence, recently a senator, and, since 1952, rector of the Università Commerciale Luigi Bocconi in Milan) published the complete text of all the extant account books of the famous Peruzzi Company, with a long but not exhaustive Introduction, he stated that he hoped others would make use of the published accounts because there was a wealth of material in them, only part of which he had used in his book on the crisis and failure of the Bardi and the Peruzzi Companies published in 1926. Later, he did find time to publish several articles dealing with the material in the Peruzzi account books: articles on the internal organization, personnel, and legal responsibility of the company and on the fourteenth-century practice of opening an account for charity entitled "messer Domeneddio," to mention only the leading one. The articles were republished in his volume of collected essays, *Studi di storia economica medievale* (1st ed., Flor-

ence, 1940; 2d ed., 1946), which is unfortunately out of print. Sapori would have welcomed an honest attempt to summarize his contributions on the role of the Peruzzi Company of merchant-bankers.

Giuseppe Muré has apparently read almost everything Sapori has written. His book is a piecing together of summaries of Sapori's studies, in a logical order, in a format easy to handle, and in a style that is usually simple and clear, whereas the much more literary style of Sapori is not easy for foreigners to read. Although it is evident that Muré understands modern banking, he does not understand just what is meant by a *mutuum* and when the church permitted interest, so that his discussion of the use of funds by the company is confusing (Part II, chap. 3).

Every reviewer is naturally inclined to condemn this book because the author has tried to conceal his indebtedness to Professor Sapori. In his Introduction he never mentions him and claims that he himself has examined the Peruzzi account books, which he has done only in the printed edition available to everyone. In a Bibliography of 168 titles, most of which have little if anything to do with the subject, he fails to mention Sapori's edition of the Peruzzi account books—in other words, he seems to wish to conceal the fact that they have been published—and he lists the *Studi* of Sapori without giving any indication that the volume contains several valuable studies on the Peruzzi books. Only once, on page 66, after a page reference to the account books, he adds "Ediz. Sapori, *Libri di Commercio*," so well concealed that Italian reviewers have missed this single reference to the masterly publication of Sapori.

The author's purpose in this concealment is puzzling. He certainly cannot deceive anyone. Sapori's work is too well known, even to the general public in Italy. The book seems to have been privately printed. The author lists a short study of his published in Ragusa in 1948. No one seems to know who he is.

FLORENCE EDLER DE ROOVER, *Florence, Italy*

GOVERNMENT IN ECONOMIC LIFE

The Ruhr, a Study in Historical and Economic Geography. By Norman J. G. Pounds. Bloomington: Indiana University Press, 1952. Pp. 283. $4.00.

The Ruhr area, until the French Revolution, had, besides some coal mining for export, but one important domestic industry, textiles. The metal working industry, dating back to the Middle Ages, was located south of the area, where poor iron was mined by small holders on a part-time basis, charcoal-processed, and hammered into swords (later cutlery) by guild-controlled skilled craftsmen at medieval Solingen and Remschied. It was threatened with extinction toward the end of the eighteenth century when England began to produce iron cheaply. With the advent of the French-sponsored Kingdom of Westphalia came unification of small principalities, abolition of tolls and tariffs, and, above all, through state assistance (p. 75), the introduction of the "English secret," the coking process, thus laying the foundation for the coal-based steel industry in the Ruhr area proper. Prussia's mercantilist policies, high tariffs, special freight rates, and

concealed subsidies, such as monopoly prices for military goods, nurtured the industry to a competitive position in the world market.

As a geographer, Norman Pounds is mainly interested in physical aspects, technological innovations, and geographic factors facilitating vertical integration (of which he presents an excellent and well-documented survey), but as a consequence an equally important phase is neglected—organization and control, the intricate web of finance capital, *Kartellpolitik*, secret agreements, power struggle, and the intimate relationship between conservative governments and Ruhr barons. He tends to minimize the influence exerted by the industrialists on the policies of the government as well as the part played by the state in the rise of the Ruhr industries. Though it is obvious that Germany could not have engaged in aggressive foreign policies backed by a large army and navy without active participation of the Ruhr industry, and Mr. Pounds does not deny it, he naïvely assumes, "after careful examination" of Bismarck's *Nachlass*, that there is no proof that "he [Bismarck] was ever directly influenced in his policy by the industrialists" (p. 242). A few "incidents" are casually mentioned—notably the notorious Krupp bribery trial, the Mannesmann ore concessions, and Thyssen claims in Morocco, of "doubtful legality," which "caused a great deal of embarrassment in Berlin" (pp. 244, 245).

Though the Weimar regime did not interfere with their freedom of action, the Ruhr industrialists regard it as a sort of interregnum. Like so many good British Tories of whom it is said that they live by instinct and tradition rather than by reason, these industralists were, above all, tradition-bound and unyielding monarchists, but unlike their British counterparts they were determined not to compromise with nineteenth-century liberalizing forces (which were particularly strong in the great Rhenish cities). When, after the Napoleonic Wars, they stepped into the places of the vanishing old feudal aristocracy, they demanded and were accorded "the respect and obedience which had formerly been due to the feudal barons." The "new baronage" was as selfish and "as dynastically aggressive as any of the old." Factories and mines were "the new fief" (p. 82).

As "technician-promoters," the new entrepreneurs supervised at first every detail of manufacture. Gradually, however, they relegated this work to hired technicians. Mr. Pounds suggests that a managerial revolution (à la Burnham) had taken place. Actually, the Ruhr dynasties had not only retained and consolidated their control via integrations and circular combinations but had also achieved, like the *zaibatsu* in Japan, the rather anomalous position in the Western capitalist world of a fixed feudal caste with a tightly knit managerial hierarchy serving their dynastic interests. "New blood" (Hugenberg, Vögler, etc.) coming from the outside was (as in the case of the *zaibatsu*) easily absorbed. Only after the Nazi regime had become entrenched in power did interlopers like Flick, Hugo Wolf, and finally that party monster combination, the Hermann Goering Works, threaten their existence. They might have shared the fate of one of them, Fritz Thyssen, if, ironically enough, the Nazis had not been vanquished!

Thus, while these industrialists were engaged in building industrial empires, with resulting overcapitalization, they came to be dependent on the government for direct subsidies and guarantees to replace obsolescent equipment and build the costly new synthetic fuel plants. "The endless claim for Reich guarantees is

a downright *testimonium paupertatis* to private initiative and to the readiness of the industry to bear responsibilities," observed Mr. Funk, the Nazi minister of economics.

After the First World War, Keynes envisioned a stable, peaceful, trading system with expanding markets centered around the German workshop with Ruhr coal and steel as its core, once reparations were forgiven, the revolutionary tide subsided, and the German republic firmly anchored and integrated into a liberal capitalist world. Mr. Pounds feels that "a generation of nationalism and autarchic development has done little to modify the picture thus presented by Keynes" (p. 262). The present trend, however, toward recartelization, Reich guarantees, restitution of vast properties, and interdependence of government and industry is an indication that, unless checked by a steel authority with *real* power, the Ruhr industry may revert to its prewar pattern.

Completed at the time when the Schuman Plan was proposed, the book, though well organized and interesting as a historical and geographic study, contributes comparatively little toward an understanding of postwar development.

FREDERICK SETHUR, *College of the City of New York*

The Theodosian Code and Novels and the Sirmondian Constitutions. A Translation with Commentary, Glossary, and Bibliography by Clyde Pharr, in collaboration with Theresa Sherrer Davidson and Mary Brown Pharr, with an Introduction by C. Dickerman Williams. Princeton: Princeton University Press, 1952. Pp. xxv, 643. $20.00.

The Codex Theodosianus is the first official legal collection made during the period of the Roman Empire. The Code contains laws called "constitutions" promulgated by the emperors from the time of Constantine I (A.D. 313) until it was issued in the year 438. The Novels (*novellae*) or new laws cover the period from 438 to 468. The Theodosian Code is one of the most important sources for the economic history of the late empire although the information it furnishes us is added to and illumined by the literary texts, papyri, and so on. The Code contains a great abundance of information on state monopolies, the hereditary occupational status of workers, the colonate (first mentioned in the famous text in Book 5, Title 17, Const. 1), the shortage of food in the late empire and the desperate shortage of labor, taxation, land tenure, price ceilings and floors, inflation and the black market (in the fourth century the well-to-do lived out their lives on the black market), shipping and shipmasters, guilds, etc. Laws relating to economic conditions are to be found throughout all sixteen books of the Code, but the most important material is contained in Books 5 and 10 through 15.

The translation of the Code, Novels, and Sirmondian Constitutions (a collection of sixteen laws so called from Jacques Sirmond, who discovered and published them in 1631) is excellent, literal, readable, and intelligible. This has been no small undertaking. Clyde Pharr and his collaborators have rendered an enormous service to students of Roman imperial law and history. The scholar will, however, doubtless always use the Latin text, but who will deny the usefulness of this volume even to him? The Commentary and Glossary are serviceable; the

Bibliography is pretty thin, containing Boak's textbook of Roman history and omitting valuable studies by Ernest Stein, J.-R. Palanque, M. J. Higgins, W. Ensslin, and others. The dates of a number of laws in the Code are suspect, but the editors have failed to incorporate or otherwise to note some of the sound corrections of Otto Seeck's *Regesten d. Kaiser u. Päpste f. die Jahre 311–476 n. Chr.* (Stuttgart, 1911). There is an intelligent but rather unprofessional Introduction by Mr. C. D. Williams. Most of what Mr. Williams states is very well known, but other topics of recent interest to scholars, such as the apparent well-being of Africa in the fourth century, are not noted; for Africa we may turn to E. Albertini, in the *Bulletin de la Société Nationale des Antiquaires de France,* 1933, pp. 109 ff., a reference which is also missing from the Bibliography. For other such matters we must also turn elsewhere.

The Princeton University Press has done a magnificent job of bookmaking, worthy of the fine translation to which Pharr and his coworkers have devoted many years. Every student of the late empire will want this volume close at hand, and every library in the country that takes itself seriously should order a copy of it.

KENNETH M. SETTON, *University of Pennsylvania*

Foreign Aid by the United States Government, 1940–1951. [A Supplement to the *Survey of Current Business.* Office of Business Economics, Bureau of Foreign and Domestic Commerce, U.S. Department of Commerce.] Washington, D.C.: Government Printing Office, 1952. Pp. vi, 118. $1.00.

This publication provides a convenient and comprehensive record of United States Government foreign aid (loans and grants) during eleven fiscal years beginning July 1, 1940, and ending June 30, 1951. The basic statistical information is presented in eleven tables in which data on aid are organized by period, program, agency, and recipient country. Information on reverse grants and repayments to the United States of America is also included. The tables are preceded by a description of the accounting concepts and definitions and are followed by a tabulation giving the pertinent facts about the major legislative enactments concerning foreign aid. These basic materials constitute the second half of the publication. The first half is devoted to an analysis of the basic tables, with some attention to the historical circumstances attendant upon each of the aid programs.

There is little doubt that the report provides a highly satisfactory summary of foreign aid. However, it may be mentioned that none of the tables is devoted to an analysis of the kinds of commodities and services the foreign aid was used to buy. This subject is treated briefly in some short paragraphs in the first half of the report, but the commodity data that were available in the semi-annual reports of the E.C.A. and M.S.A. are not summarized. A commodity breakdown of the aid rendered would have been at least as useful as the agency breakdowns that are included.

Data on aid for the period following that covered by this report may be found from time to time in the *Survey of Current Business.* The March 1953 issue, for

example, carries the aid record down to December 31, 1952. This source employs accounting definitions and data breakdowns similar to those in the report under review, thus making a continuing summary of foreign aid readily available.

Turning now to the substantive aspects of the report, one naturally finds it difficult to summarize what is already a summary of the dozen programs through which $82 billion was disbursed. The aid rendered in wartime, well over half of the eleven-year total, was almost all lend-lease. The unified character and singleness of purpose of wartime aid make it easier to explain that part of the "giveway" phenomenon than the more complex postwar programs. The postwar aid programs represent a series of largely *ad hoc* measures designed to meet as they arose the most urgent needs for relief, economic recovery and development, and military assistance. The list of programs—U.N.R.R.A., European Recovery, Greece, Turkey, China, Korea, etc.—almost suffices to enumerate the more serious international political crises of the times.

About two thirds of the wartime aid went to Britain and the Commonwealth and one fourth to the U.S.S.R. Net lend-lease of $39 billion was settled along with certain other accounts for a total of a little more than $1 billion, mostly in the form of funded debts repayable over a long period of years and bearing 2 per cent interest. This excludes accounts with China and the U.S.S.R., which have not yet been settled. The share of the United Kingdom was also large in the postwar period, accounting for one fifth of all United States aid. When aid received by five other countries of Europe (France, Germany, Italy, Greece, and the Netherlands) is added to that of the United Kingdom, well over half of the funds are accounted for. However, nearly three fourths of the aid to the United Kingdom was on a loan basis, while only one fifth of the aid to the other countries was expected to be repaid.

Looking beyond the multitude of detailed statistics and individual facts in the report, the basic aspect of the aid programs is the rather obvious one that foreign aid is a political and not an economic phenomenon. Originated in wartime, it has in peacetime become a major instrument of United States foreign policy. Thus the roster of aid recipients has shifted with changing political alignments: ten years ago we were pouring matériel into Russia to help that country defeat Germany and eventually Japan; after the war Germany and Japan received about $6 billion worth of aid. Spain and Yugoslavia are other examples of countries now receiving aid that were formerly viewed askance in our foreign policy. The political nature of the aid programs is also shown by the recent shift in emphasis from Europe to Asia and by the fact that neither of these areas had attracted the bulk of United States funds in the days when capital outflows represented profit-seeking by private investors. Finally, the future of the aid programs is shrouded in political uncertainty. The world demand for United States goods is very great. The United States of America can, of course, refuse to satisfy this demand to the extent that it has been satisfied in recent years simply by failing to make the necessary dollars available through either the continuation of gifts or increased purchases abroad, but this would represent a step toward the isolation of the United States that seems incredible in this shrunken world. On the other hand, the pressures against further aid appropriations and against increasing our

imports are strong. Will one or both of these pressures give way in the face of the requirements of our international position?

IRVING KRAVIS, *University of Pennsylvania*

The Economic Development of Iraq—Report of a Mission Organized at the Request of the Government of Iraq by the International Bank for Reconstruction and Development. Baltimore: The Johns Hopkins Press, 1952. Pp. xix, 463. Maps and figures. $5.00.

The long subtitle shows at a glance both the origin of this book and its purpose. The official request by Iraq reached the I.B.R.D. in October 1950. A mission recruited from a number of United Nations agencies arrived in Iraq in February 1951 and the last members left the country three months later. A prodigious amount of work was thus accomplished in a short time, the results being all the more notable in view of the primitive technical and physical facilities with which the mission had to contend. The report consists of two parts. The first contains major findings and recommendations. The second contributes a series of monographic commentaries that embody the mission's views on relevant key subjects.

Iraq is a manifold anomaly, not the least so in an economic sense. A country with a population of about 5,000,000, it has a per capita income of barely $75.00. Yet the expected oil revenues for the next five years may reach the total of three quarters of a billion dollars. Under a law passed in 1950, this enormous yield has been earmarked for development, hence the obvious need for competent advice and assistance. The mission has done its utmost to work out a feasible solution. Its program is bold and ambitious. In average circumstances it should have an excellent chance of reasonable success. But in the Arab countries economic prospects are subnormal in spite of the exceptional potential of those states among them that are fabulously rich in oil reserves. The problems involved are perhaps nowhere as well illustrated as in Iraq.

The authors of the report rightly stress the fact that the desired development "will require not only the wholehearted co-operation of the entire government but, above all, a sustained and energetic effort by the Iraqi people as a whole" (p. 99). They go on to say: "Development is a truly individual as well as a national effort. Only in this way is there a guaranty that it will redound to the national welfare" (*ibid.*). Perhaps they had an inkling, when they expressed these obvious truths, of the real obstacles in the path of a sound and constructive development program, although they could scarcely be blamed if they had been wholly innocent of that much perception. Our diplomatic representatives in the area are often blind to the underlying factors even after years of assignment to Middle East posts. At all events, the mission ignores, either through choice or from necessity, the societal and political coefficients. Yet these happen to be normative to a degree unparalleled outside the Islamic community in general and the Arab world in particular.

Arab countries today suffer primarily from the mutually interacting forces of Islamic tradition and obsessive nationalism. Because of the rigid merger within

it of Church and State, Islam has helped to bring about gradually the sharp social imbalance which now characterizes all the Arab lands. That imbalance cannot be rectified short of a profound upheaval. Yet those in power are bent on maintaining the *status quo*. Here is one example the mission cites but fails to trace back to its ultimate source: The bulk of the land is concentrated in the hands of a thin layer of landowners. Much of that land has been obtained from the state on the basis of tenuous proof of occupancy. Now whereas the income tax bears heavily on the salaried classes, already underpaid, the landholders, aided largely by recourse to tradition, have been exempt from taxes since 1936.

In matters of internal politics, Iraq is handicapped by the sectarian antagonism of the Shi'is against the Sunnis, the two main denominational groupings within Islam; in Iraq they are approximately equal in numbers, but the Sunnis dominate the scene—much to the others' resentment. Furthermore, nearly a fifth of the population consists of Kurds, who are Moslems but speak a language unrelated to Arabic and have little cause for appreciating Arab dominance. National unity, so essential to a concerted developmental effort, is thus conspicuously lacking. The government strives to divert attention from the ills within by added emphasis on pan-Arab nationalism. One of the by-products of that policy is a pronounced antiforeignism which puts all cultural imports under the severest kind of discount. In a climate of this sort it would be very difficult to follow resolutely the recommendations of a Western economic mission. One must hope that the sound analysis and program contained in the report before us will have the desired effect, since stability throughout the Middle East is essential to world security. But one cannot be too sanguine about the immediate prospects.

E. A. Speiser, *University of Pennsylvania*

Wagon Roads West. By W. Turrentine Jackson. Berkeley and Los Angeles: University of California Press, 1952. Pp. xv, 422. Maps. $5.00.

This book is subtitled *A Study of Federal Road Surveys and Construction in the Trans-Mississippi West, 1846–1869*. The period begins, of course, with the United States Army's necessary interest in routes across territory formerly Mexican and ends with the completion of the first transcontinental railroad.

The author takes the point of view that whereas the pioneer in the covered wagon and the businessman who organized the overland mail and freighting lines have perhaps received their just due from historians, the role of the National Government in exploring, surveying, building, and improving roads has been underemphasized. He has carefully examined the maps and manuscript records of both the War and Interior Departments, being the first to use the papers of the Office of Pacific Wagon Roads.

This study then is an original contribution to the history of the West. The frontiersman and settler may have been ardent individualists, but they invariably wanted government funds for building roads, usually under the guise of military necessity. Congress supplied these funds, and Army topographical en-

gineers and Interior superintendents laid out a network of roads, some of which had little significance while others had immediate and future influence. For example, the Mullan Road between the Columbia and Missouri Rivers was early used by mining prospectors, and its route is now followed in part by three railroads and a federal highway. Future histories of western expansion will presumably give more weight to the factor of military roads than has been accorded, say, by Paxson and Billington.

The book is well indexed and twenty maps are supplied, with authorities given for their derivation. The conclusion contains a summary of the constitutional argument over federal powers of road building and might well be read first.

WHEATON J. LANE, *Princeton, N.J.*

The Mint: A History of the London Mint from A.D. 287 to 1948. By Sir John Craig. Cambridge, England: The University Press, 1953. Pp. xviii, 450. 70*s.*

Sir John Craig, author of *Newton at the Mint* (Cambridge University Press, 1946), now has given us a most valuable history of the English mint from its beginnings. Works of such high caliber in monetary history are so rare that their appearance is the occasion for rejoicing on the part of students in the field. Cambridge University Press has given suitable recognition to the occasion by bringing out an exceptionally handsome volume with attractive make-up, first-rate illustrations (including excellent photographs of coins—always a difficult feat), and, unfortunately, a prestige price. Among its ornaments are several useful Appendixes, a good Bibliography, and Indexes of both subjects and persons.

The most valuable aspect of this volume is its completeness. The author has managed to make at least a short reference to every change of which we have record in the organization, administration, and techniques of the mint. Numismatists, especially, will be pleased with the precise metrological information on virtually every coin ever struck in England and with the careful listings not only of masters of the mint but also of deputies, wardens, engravers, and many other mint officials. Students of technological history will find here gratifying lucid explanations of the processes of assaying and refining precious metals and of the art of striking coins. Another asset is a certain breeziness of manner surprising in a former Deputy Master of the Royal Mint writing, apparently, on his favorite subject. ("Hugh Wichyngham of London took Bruselee's new post on 7 November 1355 and swopped it two years later with Potter for the mastership.")

When venturing outside the confines of the Tower or of Little Tower Hill, however, Sir John, we regret to say, comes a few unfortunate croppers. The French gros tournois first appeared in 1266, not 1230; "the showy Emperor Frederick III" turns out to be Frederick II; the ransom of King John of France was not paid in "crowns of poor silver," since crowns were not struck until the reign of Louis XIII; the handsome portrait coin of Henry VII is not a shilling but a testoon, from the Milanese *testone* which was its model; and not "the exactions

of Prussia after its victory over France" but rather new silver mines depressed the price of that metal after 1873.

Economists and historians not especially interested in monetary history will raise a more serious criticism of this book. The facts are all here, but we are left in the dark regarding their more general significance. Only occasionally are we given glimpses of how changes in the mint (essentially a passive institution) were related to changes in the outside world. There is almost no discussion of the effects of price fluctuations, fiscal developments, and changes in international trade. Nowhere does Sir John take advantage of many opportunities to view episodes in the history of the mint in the light of monetary theory. His intentions, rather, are to compile an accurate chronicle of changes in the management and techniques at the mint. In form, therefore, his work is a rather narrow business history. Used as such, its wealth of facts makes it an admirable supplement to Feavearyear's *The Pound Sterling* and to other standard works on English monetary history.

MARTIN WOLFE, *University of Pennsylvania*

Money and Credit in China. By Lien-sheng Yang. (Harvard-Yenching Institute Monograph Series, No. 12.) Cambridge: Harvard University Press, 1952. Pp. 143. $4.00.

As Lien-sheng Yang indicates, this book is a study of key terms in the history of money and banking in China and a collection of classroom reports with some additional elaboration. Its declared purpose is to answer the seven specific questions the author sets up in the first paragraph of the opening chapter. These questions have to do with materials used for money, the right of coinage and note issue, taxes in kind and in money, the extent of legal tender, banking facilities, interest rates, and loans in Manchu China. Simply enough, their respective answers are given right away in general terms in the same opening chapter. The other nine chapters that follow serve only to provide minute, though often piecemeal, details.

The scope of this information is necessarily limited, and the form of its presentation (in numbered paragraphs) appears rather elementary. However, from a "short history" of 143 pages, with 40 of them occupied by notes and an Index to Chinese characters, one can hardly expect more. Besides, by drawing from Japanese, English, and German, as well as Chinese sources, and freely utilizing periodical materials, the author has pursued thoroughly his limited subject. It is perhaps due to this scholarly quality that the book goes far beyond its nominal boundary in terms of usefulness and interest.

In the survey of economic institutions and activities, for instance, several fundamental laws are revealed with considerable clarity: a low reserve for note issue and government spending plus speculation on the part of merchants would certainly bring about malignant inflation; economic inability often reflects administrative corruption and precipitates social chaos and political collapse; and a convenient means of exchange usually stimulates the growth of commerce and trade, while a cumbersome one hinders economic development in general.

But the most important feature of the book is the revelation of the changing fortunes of China as a political and cultural power and of the continued deterioration of the fabric and structure of the traditional Chinese society.

During the heydays of T'ang, Sung, Yan, and Ch'ing, China's copper coin and paper money, among her other cultural attainments, were accepted by all countries to her east and south and far into the seas; silver coins went into Tibet by way of conquest. But, from the sixteenth century on, Spanish, Mexican, British, American, and Japanese dollars successively invaded, and at times dominated, the Chinese market. Genghis Khan's dynasty had caused China's banking practices to be known to the West, but China's first modern bank, in the latter half of the nineteenth century, had to be inspired by foreign banks that established themselves on Chinese soil free of Chinese laws with the backing of "strong ships and powerful guns."

China was on the wane. But the traditional Chinese society was even more so. The emperor, the imperial princes, and top-ranking officials led the way in the hoarding of silver and gold. Professional moneylenders found the easiest way of making the highest profits. The noble collaborated with the wealthy, and *vice versa,* at the expense of the poor, among whom the peasants in particular lived constantly on borrowing. The latter were at the mercy of middle agents and a "vicious circle of high rates of interest." Co-operative efforts had to be made by the peasants in order to purchase a common necessity—a cow. Even money was classified according to the different qualities of its material, and consequently used by "higher and lower" classes of people. The fact that rent and interest were sometimes paid by labor services and that the family of an employee was, in some localities, held by his employer for security ominously suggested bondage and slavery. In the government there was arrogance in the matter of economic policy; there was corruption and irresponsibility. On the highway, an insurance agency would collaborate with bandits. In society as a whole, economic development was not only ignored but despised; a low standard of living was not only accepted as a fate but theorized as a desirability. Consequently, an investor found his returns highest in moneylending but trailing much behind in commerce, industry, and agriculture.

No reader can fail to grasp that, by placing the chapter on loans and interest rates at the end, the author is actually placing an indictment before the court of history against the traditional Chinese society. And his concluding sentence surely amounts to a suggestive warning: "In order to reform the Chinese society," says he, "both economic and noneconomic changes will be necessary."

Thus Mr. Yang gives the reader something to think about beyond his nominal questions and answers. Those who wish to take a closer look at the problem may do so by consulting Cheng Po-pin, *Hsin Huo-pi Hsin-yung Chih-tu* [The New Money and Credit System in China. Shanghai: Chung Hua Book Co., 1951]. Chao Kuo-chün's recent study, *Northeast China (Manchuria) Today* (Cambridge: Massachusetts Institute of Technology, Center for International Studies, 1953), also offers a section on the subject.

SHEN-YU DAI, *University of Pennsylvania*

Correspondence

Heavy Industry and Union Labor in the Weimar Republic

George W. F. Hallgarten, in his article on "Adolf Hitler and German Heavy Industry" (The Journal of Economic History, Summer 1952), effectively dispels some simplifying notions about the relationship of German business and the Nazi party. On one point, however, Mr. Hallgarten himself makes a statement which, I believe, should not go unchallenged. Having correctly explained that prior to 1929 the support which heavy industry gave to the Nazis was sporadic and on the whole not very important, Mr. Hallgarten maintains that in this period, especially "as soon as actual fighting [against the Communists] stopped" German heavy industry chose as an alternative "a policy of co-operation with the German trade unions"; a little later he speaks explicitly of the industrialists' "political collaboration with union labor." The record, however, contains no facts that could be properly described as such collaboration.

Mr. Hallgarten mentions the co-operation agreement—*Zentralarbeitsgemeinschaft*—concluded in the "defeat-clouded autumn of 1918" between the employers' association and the labor unions, with heavy industry taking a leading part on the employers' side. But, in the first place, it would be far-fetched to call this agreement an act of *political* co-operation, since it dealt exclusively with conditions of employment and tried to establish a framework for collective bargaining, with no political clauses. Secondly, the agreement was concluded on the eve of the Communist upheavals and did not survive the political consolidation which followed the stabilization of the German currency: in March 1924 the *Zentralarbeitsgemeinschaft* was dissolved. Consequently, Mr. Hallgarten's timetable ought to be reversed: there was more collaboration—though none in the political field—between heavy industry and organized labor before "actual street fighting stopped" than there was afterwards. Politically, heavy industry was at all times the opponent of labor, and, economically, the antagonism increased continually until the great labor dispute which hit the steel industry in 1928 and which was really a lockout by the employers with the purpose of breaking the German arbitration system.

The political conflicts between heavy industry and organized labor during the period 1924 to 1928 were too frequent for complete enumeration. A few examples must suffice: labor supported the foreign policy of Stresemann, heavy industry opposed that policy in principle and most of the time in practice; heavy industry—next to agriculture—was most vociferous in demanding high tariffs, labor opposed high tariffs; heavy industry was the most active defender of cartels, labor—with a few reservations—supported antimonopoly legislation; heavy industry supported Hindenburg as a candidate for the presidency, labor supported the moderate Catholic Heinrich Marx; labor (except, of course, its Communist wing) was the

strongest supporter of the democratic republic, heavy industry was its most dangerous opponent. At least some leaders of the Ruhr industry went even beyond the limits of legality in this opposition: in 1926, the Prussian police detected a conspiracy of industrialists aiming at the violent overthrow of the republican government.[1] When the majority of the Ruhr industrialists turned to the Nazi party during the depression, they did not establish any new goals or revamp their relationship to labor: they merely changed weapons.

Heavy industry, of course, had its internal dissensions. Stinnes, at times, was more moderate than some of the others, and the same was even more consistently true of Paul Silverberg, the king of lignite and electric power. On the other hand, Paul Reusch and, of course, Fritz Thyssen belonged to the intransigents. But German heavy industry was a sufficiently coherent sociological entity to achieve essential unity of action—most of the time. It should be noted, however, that only producers of coal and steel belonged to this sociological group. Independent machine manufacturers (especially those of machine tools) played an entirely different political role: they were the most progressive wing of German industry, and their influence within the Union of German Employers' Associations (*Vereinigung deutscher Arbeitgeberverbaende*) prevented for a number of years the breakdown of the machinery for the control of industrial warfare. Heavy industry belonged only nominally to the *Vereinigung:* it had its own agency for handling labor matters, the Northwest Employers' Group.

I am aware that Mr. Hallgarten's remark about political collaboration between heavy industry and organized labor represents merely a brief passage in his interesting and informative article. But if this *obiter dictum* had to be accepted, the course of political and economic events in the Weimar Republic would become unintelligible. Therefore I think it necessary to register dissent.

Carl Landauer, *Berkeley, California*

Comments on Mr. Landauer's Letter

I appreciate Mr. Landauer's interesting remarks and do not see any basic difference between his interpretation of this particular problem and the one I would give. The expression "political co-operation"—I nowhere employed the term "collaboration"—which I used in one instance with reference to the relationship between heavy industry and trade unions was neither meant to deny the involuntary character of this co-operation (the co-operation resulted from Germany's defeat in the First World War) nor the existence of the cleavages and fights between the two elements in question, inherent in all such relations. By using the term "political" I meant that the *motive* for, not the nature of, the co-operation was political. Besides, the passage quoted by Mr. Landauer is contained in part I of my article which, as stated in footnote 1, is only a summary of the nonprinted first half of my manuscript. Thus, my opinion on this particular point might have

[1] See the memoirs of the prime minister of Prussia at the time: Otto Braun, *Von Weimar zu Hitler* (Hamburg: Hammonia, 1949), p. 99.

become slightly blurred through abridgment. In the original, there is a lengthy passage running along the line of Mr. Landauer's thoughts.

There is still one specific point in Mr. Landauer's letter, however, which I believe calls for comment; that is, his remark that my timetable concerning that co-operation should be reversed. The facts are that this co-operation started in October 1918, a few weeks before the German Revolution of November 8 which led to a series of street fights and to the assassination of Liebknecht and Rosa Luxemburg on January 15, 1919. During this period, the co-operation was temporarily offset by the industrialists' backing the Fascist forerunner Stadtler. Resumed in full after these events, it lasted, in an organizational form, until March 1924, and in the form of collective bargaining to the end of the Republic. Thus, using the yardstick of time, I think I would be fully justified in saying that there was more co-operation *after* than *before* the street fights—but I did not even say that. There is no question that the co-operation of October–November 1918 which resulted from panic on both sides was more intense than that of the later period, but I did not deny this nor would I. In concluding, it gives me pleasure to see that, with the exception of this minor question which I hope is herewith cleared up, Mr. Landauer finds my article interesting and informative.

GEORGE W. F. HALLGARTEN, *Washington, D.C.*

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